LETTING DATE
Oct 19 2027

Bridge Replacement-PPCB
BRF-004-5(51)--38-74

PALO ALTO COUNTY

INDEX OF SHEETS	
No.	DESCRIPTION
A Sheets	**Title Sheets**
A.1	Title Sheet
A.1	Location Map Sheet
B Sheets	**Typical Cross Sections and Details**
B.1 - 4	Typical Cross Sections and Details
D Sheets	**Mainline Plan and Profile Sheets**
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2	IA 4 Plan and Profile
G Sheets	**Survey Sheets**
G.1	Reference Ties and Bench Marks
G.2	Control Point Vicinity Map
G.3	Horizontal and Vertical Control Tab.
J Sheets	**Traffic Control and Staging Sheets**
J.1	Traffic Control Plan
J.2	Staging Notes
* J.3	Traffic Control Legend & Symbol Info. Sheet
* J.4 - 6	Staging and Traffic Control Sheets
U Sheets	**500 Series, Mod.Stds. and Detail Sheets**
U.1	TBR Transition Pinned to Unpinned
V Sheets	**Bridge and Culvert Situation Plans**
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W Sheets	**Mainline Cross Sections**
* W.1	Cross Sections Legend & Symbol Information Sheet
* W.2 - 22	IA 4 Cross Sections
	* Color Plan Sheets

IOWA DOT

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM

PALO ALTO COUNTY

Bridge Replacement-PPCB

W. Fork of Des Moines River
3.2 mi S of S Jct. US 18

--

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

Value Engineering Saves. Refer to Article 1105.14 of the Specifications.

IOWA ONE CALL
1-800-292-8989
www.iowaonecall.com
811 Know what's below. Call before you dig.

REVISIONS

TOTAL
..
PROJECT IDENTIFICATION NUMBER
21-74-004-020
PROJECT NUMBER
BRF-004-5(51)--38-74
R.O.W. PROJECT NUMBER
STPN-004-5(052)--2J-74
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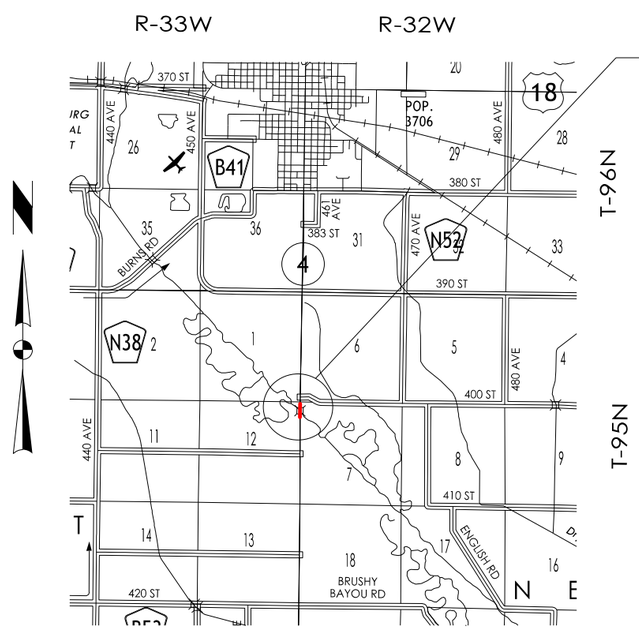


PROJECT LOCATION
FHWA # 39221
REF LOC 109.9

DESIGN DATA RURAL			
2026	AADT	2800	V.P.D.
2046	AADT	2900	V.P.D.
2046	DHV	300	V.P.H.
TRUCKS		13	%
Total Design ESALs		-	

INDEX OF SEALS			
SHEET NO.	NAME	TYPE	BID QUANTITY SHEETS
A.1	X	Primary Signature Block	X
X	X	X	X

P9 PLAN - Date: 02/19/2025
D4 PLAN - Date: 06/23/2026

PRELIMINARY PLANS

Subject to change by final design.

D5 PLAN - Date: 10/04/2024

FILE NO. 32299	ENGLISH	DESIGN TEAM JIA / SCHOENROCK / RYAN	PALO ALTO COUNTY	PROJECT NUMBER BRF-004-5(51)--38-74	SHEET NUMBER A.1

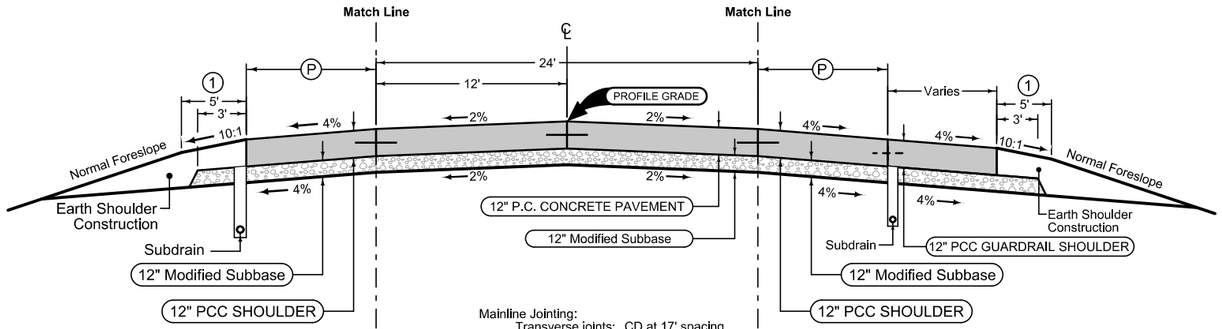
3:46:33 PM 10/3/2024 jryan3 pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Projects\7400402021\Design\CADD_Files\Sheet_Files\SHT_7400451_A01.dgn

Full Depth PCC Shoulder

Shoulder Jointing:
Longitudinal joint: BT-2, L-2 or KT-2
Transverse joints: C at 17' spacing

2_P_FullPCC_ 04-20-21		
STATION TO STATION		(P) Feet
665+19.82	665+41.97	10

(1) For grading behind guardrail (Refer to EW-301).



Mainline Jointing:
Transverse joints: CD at 17' spacing
Longitudinal joint: L-2

2P_ 04-21-20	
STATION TO STATION	
665+19.82	665+60.80
671+28.62	671+62.09

Paved Shoulder at Guardrail

PCC Shoulder Jointing:
Longitudinal joint: BT-1 or BT-5
Transverse joints: C at mainline spacing
HMA Shoulder Jointing:
Longitudinal joint: B

2_P_Guard_ 04-21-20		
STATION TO STATION		(P) Feet
665+19.82	665+60.80	10
671+28.62	671+49.03	10

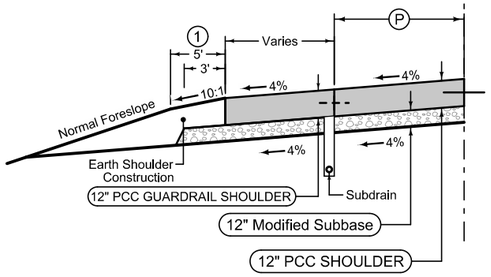
(1) For grading behind guardrail (Refer to EW-301).

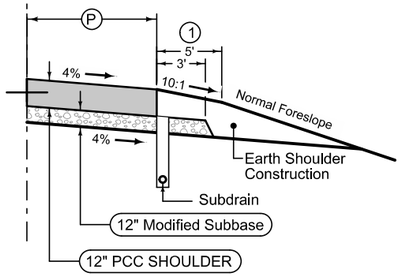
Paved Shoulder at Guardrail

PCC Shoulder Jointing:
Longitudinal joint: BT-1 or BT-5
Transverse joints: C at mainline spacing
HMA Shoulder Jointing:
Longitudinal joint: B

2_P_Guard_ 04-21-20		
STATION TO STATION		(P) Feet
665+41.97	665+60.80	10
671+28.62	671+62.09	10

(1) For grading behind guardrail (Refer to EW-301).





Full Depth PCC Shoulder

Shoulder Jointing:
Longitudinal joint: BT-2, L-2 or KT-2
Transverse joints: C at 17' spacing

2_P_FullPCC_ 04-20-21		
STATION TO STATION		(P) Feet
671+49.03	671+62.09	10

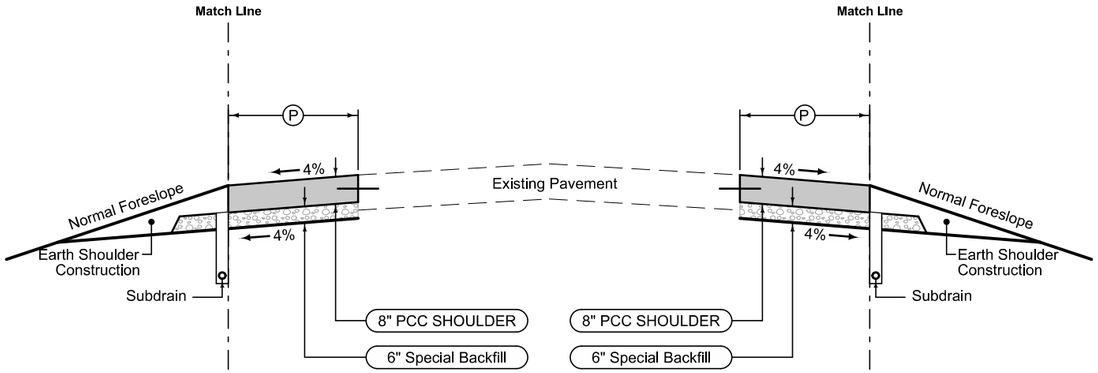
(1) For grading behind guardrail (Refer to EW-301).

IA 4

PCC Shoulder

Shoulder Jointing:
Longitudinal joint: BT-2, L-2 or KT-2
Transverse joints: C at 17' spacing

2_P_FullPCC_ 04-20-21		
STATION TO STATION		(P) Feet
662+70.00	665+19.82	10
671+62.09	674+08.00	10



PCC Shoulder

Shoulder Jointing:
Longitudinal joint: BT-2, L-2 or KT-2
Transverse joints: C at 17' spacing

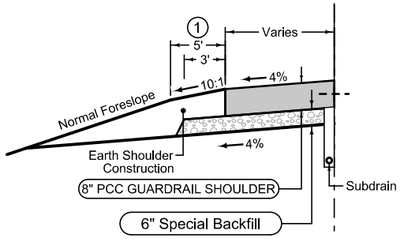
2_P_FullPCC_ 04-20-21		
STATION TO STATION		(P) Feet
662+70.00	665+19.82	10
671+62.09	674+08.00	10

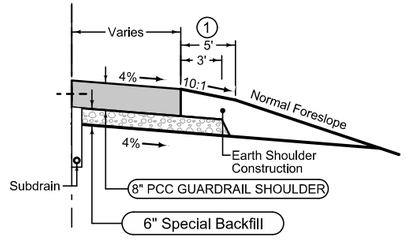
Paved Shoulder at Guardrail

PCC Shoulder Jointing:
Refer to Mod. Detail 7158
HMA Shoulder Jointing:
Longitudinal joint: B

2_P_Guard_ 04-21-20		
STATION TO STATION		(P) Feet
671+62.09	672+18.03	10

(1) For grading behind guardrail (Refer to EW-301).



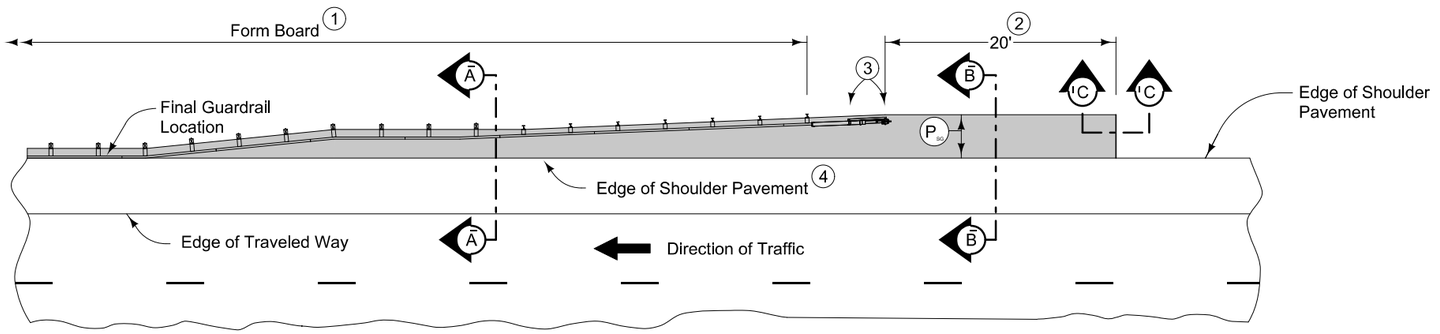


Paved Shoulder at Guardrail

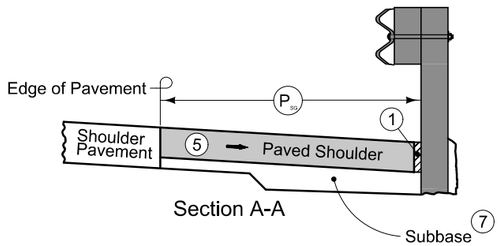
PCC Shoulder Jointing:
Refer to Mod. Detail 7158
HMA Shoulder Jointing:
Longitudinal joint: B

2_P_Guard_ 04-21-20		
STATION TO STATION		(P) Feet
664+72.97	665+19.82	10

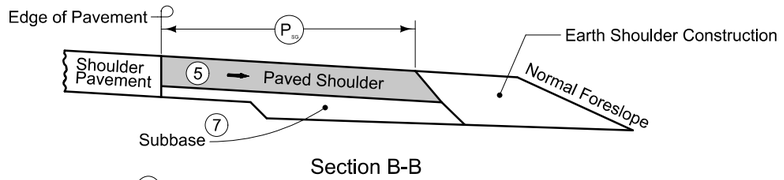
(1) For grading behind guardrail (Refer to EW-301).



PLAN VIEW

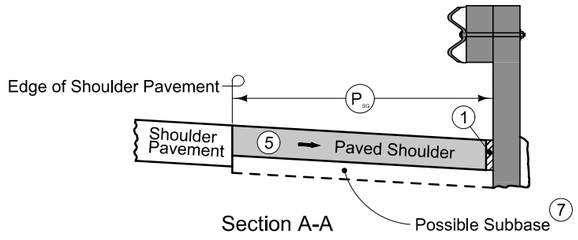


Section A-A

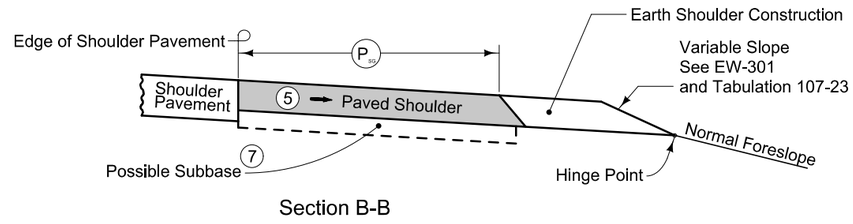


Section B-B

NEW CONSTRUCTION 6



Section A-A



Section B-B

EXISTING SHOULDER

DESIGNER INFO | 7158M Modified

PCC Shoulder at guardrail, refer to typicals for depth of shoulder:
Match mainline pavement joint spacing. When mainline pavement is 8" or greater in thickness, place additional transverse 'C' joints in shoulder at mid-panel of the mainline pavement. Place longitudinal 'C' joint at P/2 from edge of mainline pavement when P is greater than 10' wide. Terminate longitudinal joint at transverse joint less than 10' in length.

Compaction of HMA is required to face of guardrail post. Hand compaction will be allowed under guardrail. Removal and reinstallation of guardrail will be allowed with no additional payment.

Refer to Tabulation 112-9 for shoulder quantities.

(1) PCC option only: When guardrail posts are installed prior to construction of PCC paved shoulder, fasten form board to the face of guardrail posts for the length shown.

(2) Continue paved shoulder 20 feet beyond the center of the first post.

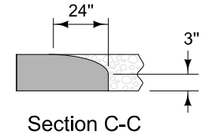
(3) Shoulder may be notched for first 2 posts or post sleeves may be installed through pavement. Do not drive posts through pavement.

(4) 'KT' (per PV-101) joint for PCC shoulder.
'B' (per PV-101) joint for HMA shoulder.

(5) Match shoulder slope.

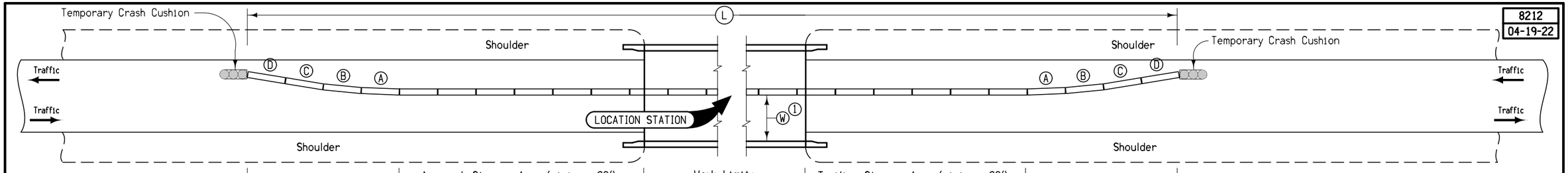
(6) The Contractor has the option to pave the paved shoulder at guardrail and the full width paved shoulder as one operation.

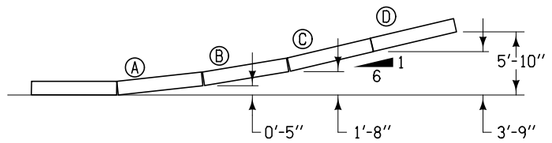
(7) Refer to other details in the plan.



Section C-C
Roll down at granular shoulder or earth.

PAVED SHOULDER AT GUARDRAIL
(ADJACENT TO FULL WIDTH PAVED SHOULDER)





BARRIER OFFSETS FOR FLARE SECTIONS

Station	Side	AA	WL	TA	L	Anchored	W ①	Remarks
		Feet	Feet	Feet	Feet	X	Ft-Inches	
664+49.17	RT	20	642.27	24.25	788.17	0	21' 0"	Stage 2
663+65.01	LT	103.8	642.27	103.9	951.99	650'	14' 6"	Stage 3a
665+09.10	RT	-	-	-	637.5	637.5'	-	Stage 3a: Bridge Barrier
664+48.79	RT	20	642.27	25.12	789.49	0	13' 8"	Stage 3b

① Where W is less than 15'-6", install restricted width signing as per Standard Road Plan TC-81.

TEMPORARY CONCRETE BARRIER LAYOUT for Two-Way Traffic

8212
04-19-22

SURVEY SYMBOLS

- Interstate Highway Symbol
- U.S. Highway Symbol
- Iowa Highway Symbol
- County Road Highway Symbol
- Evergreen Tree
- Deciduous Tree
- Fruit Tree
- Shrub (Bushes)
- Timber
- Hedge
- Stump
- Swamp
- Rock Outcrop
- Broken Concrete
- Revetment (Rip Rap)
- Cemetery
- Grave
- Cave
- Sink Hole
- Board Fence
- Chain Link or Security Fence
- Wire Fence
- Terrace
- Earth Dam or Dike (Existing)
- Tile Outlet
- Edge of Water
- Existing Drainage
- Right of Way Rail or Lot Corner
- Concrete Monument
- Well
- Windmill
- Beehive Intake
- Existing Intake
- Existing Utility Access (Manhole)
- Fire Hydrant
- WH Water Hydrant (Rural)
- Septic Tank
- C Cistern
- LP L.P. Gas Tank (No Footing)
- UST Underground Storage Tank
- Latrine
- Satellite TV Dish
- WHU Water Hook Up
- RT Radio Tower
- TA Tower Anchor
- Guardrail (Beam or Cable)
- GP Guard Post (one or two)
- Guard Post (over two)
- FP Filler Pipe
- GV Gas Valve
- WV Water Valve
- SL Speed Limit Sign
- MM Mile Marker Post
- SIGN Sign
- TCB Traffic Signal Control Box
- RRB Rail Road Signal Control Box
- TSB Telephone Switch Box
- EB Electric Box

UTILITY LEGEND

— FO —
FO1D, Iowa Communications Network - Quality D
Shannon Marlow
icnoutsideplantiowaonecall@iowa.gov
800.572.3940

PPA, Iowa Lakes Electric Coop
Kay Dahl
ioc-dir@ilec.coop
712.362.2694

— TV —
TV1D, MediaCom L.L.C. - Quality D
Jeff Anfinson
janfinson@mediacomcc.com
712.330.5198

— T1 —
— FO2 —
TL1D, Windstream Communications - Quality D
FO2D, Windstream Communications - Quality D
Locate Desk
locate.desk@windstream.com
800.289.1901

PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	
Green	(2)	Existing Topographic Features and Labels
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)	Existing Utilities
SHADING	**Design Color No.**	
Lavender	(9)	Temporary Pavement Shading
Yellow	(4)	Proposed Pavement Shading
Orange	(6)	Proposed Granular Shading
Orange	(70)	Proposed Shoulder Granular Shading
Yellow	(68)	Proposed Shoulder Paved Full Depth Shading
Yellow	(132)	Proposed Shoulder Paved Partial Depth Shading
Gray, Dark	(112)	Proposed Grade and Pave Shading "In conjunction with a paving project"
Brown, Light	(236)	Grading Shading
Orange, Light	(134)	Proposed Granular Entrance Shading
Yellow	(220)	Proposed Paved Entrance Shading
Tan	(8)	Proposed Sidewalk Shading
Blue, Light	(230)	Proposed Sidewalk Landing Shading
Pink	(11)	Proposed Sidewalk Ramp Shading
Green, Light	(225)	Existing Pavement Shading
Red	(3)	Proposed Structure Shading
Red	(3)	Delineates Restricted Areas

PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	
Green	(10)	Existing Ground Line Profile
Blue	(1)	Proposed Profile and Annotation
Magenta	(5)	Existing Utilities
Blue, Light	(230)	Proposed Ditch Grades, Left
Black	(0)	Proposed Ditch Grades, Median
Rust	(14)	Proposed Ditch Grades, Right

- Reference Point — Survey Line
- Station — Section Corner
- Ground Line Intercept
- Saw Cut
- Guardrail
- Trench Drain
- HighTension Cable Guardrail
- Sheet Pile
- Pavement Removal
- Clearing & Grubbing Area

RIGHT-OF-WAY LEGEND

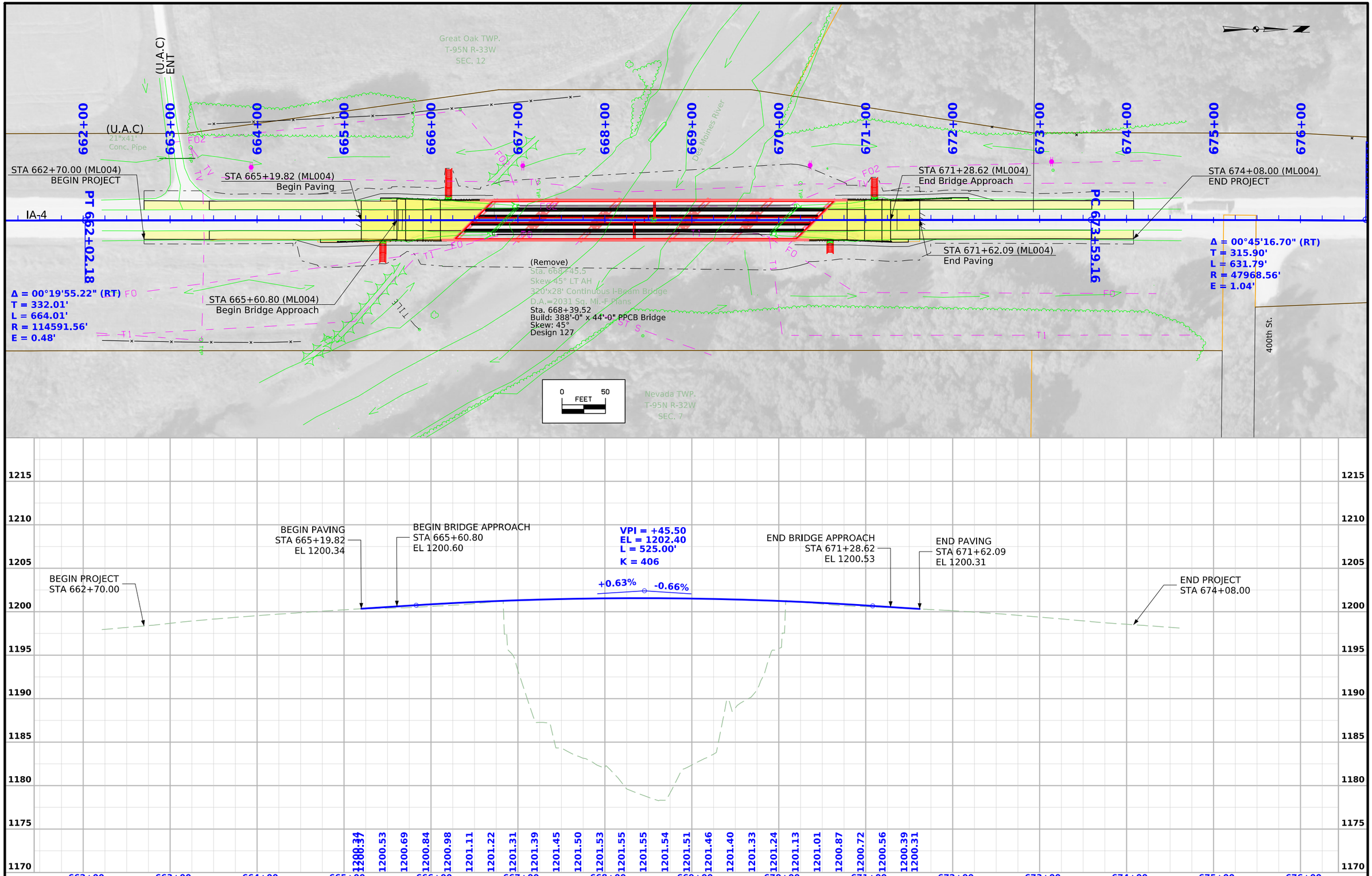
- Proposed Right-of-Way
- Existing Right of Way
- Existing and Proposed Right-of-Way
- Easement and Existing Right-of-Way
- Easement (Temporary)
- Easement
- C/A Access Control
- Property Line

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

(COVERS SHEET SERIES D, E, F, & K)

FILE NO. 32299	ENGLISH	DESIGN TEAM JIA / SCHOENROCK / RYAN	PALO ALTO COUNTY	PROJECT NUMBER BRF-004-5(51)--38-74	SHEET NUMBER D.1

4:46:30 PM 9/16/2024 jryan3 pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Projects\7400402021\Design\CADD_Files\Sheet_Files\SHT_7400451_LGD.dgn



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SURVEY INDEX

Palo Alto County
BRF-004-5(51)--38-74
W Fork Des Moines River 3.2 mi S of S Jct US 18
PIN: 21-74-004-020
Type of Work: Bridge Replacement
Project Directory: 7400402021
SAP: 991.0

Survey Personnel

Daniel Duncan – Survey Party Chief

Date(s) of Survey

Begin Date	09/13/2023
End Date	11/16/2023

General Information

This survey is for the West Fork Des Moines River Bridge on IA 4, 3.2 miles South of the US 18 junction in Emmetsburg. Approximately 550ft South of the IA 4 and 400th Street Intersection. This project is a Full Field DTM survey.

Utility Information

For logging data and other utility details see Utility Survey and Ownership Report in the Utility folder of the PrelimSurvey project directory.

Project Control

Nearby Iowa Real Time Network reference stations were utilized to obtain horizontal and vertical control on primary project control points. Three six-minute observations were taken with a minimum two-hour time span between and used in a weighted average to obtain final coordinate values. For additional details of the control survey, contact the Preliminary Survey department.

PROJECT DATUM: NAD83(2011) for EPOCH 2010.00 (IaRTN 2019 ADJUSTMENT)
COORDINATE SYSTEM: IOWA REGIONAL COORDINATE SYSTEM ZONE 1 (U.S. SURVEY FOOT)
VERTICAL DATUM: NAVD88
GEOID MODEL: 2018u3

Alignment Information

The horizontal alignment for Iowa Hwy 4 this survey is a retrace of As-built Plans No. F-17-5(2)—20-74. Survey stationing was equated to the plan POT at Sta. 646+11.60 and carried ahead without equation throughout the survey.

Survey stationing relates to as built plan stationing as follows:

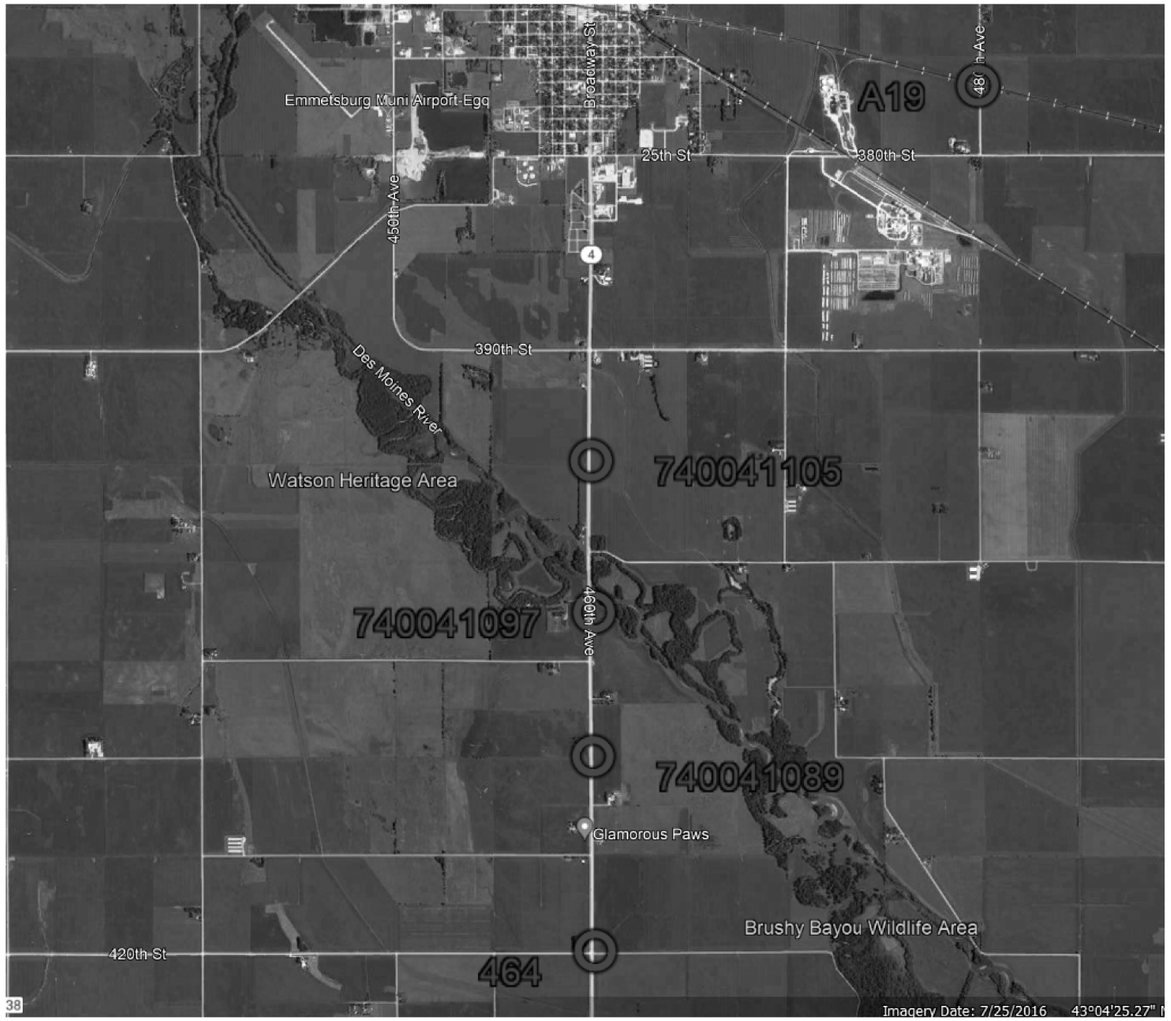
PI Sta. 658+69.64 As-built Plans Project No. F-17-5(2)—20-74
Survey PI Sta. 658+70.18

PI Sta. 676+74.85 As-built Plans Project No. F-17-5(2)—20-74
Survey PI Sta. 676+75.06

PI Sta. 698+97.00 As-built Plans Project No. F-17-5(2)—20-74
Survey POT Sta. 698+97.86

CONTROL POINT VICINITY MAP

This map is a guide to the vicinity of the primary project control points. Primary control is for use with RTK base stations and for RTN validation. Future surveys will use primary project control to establish temporary control as needed for construction or other surveying applications.



HORIZ. DATUM: NAD83(2011) for EPOCH 2010.00 (IaRTN 2019 Adjustment) - Iowa RCS Zone 01 (U.S. Survey Foot)

VERT. DATUM: NAVD88 - Geoid Model: 2018u3

Coordinate listing from next sheet will be used with IaRTN for monument recovery. No other reference ties are given.

HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING
HORIZ. DATUM: NAD83(2011) for EPOCH 2010.00 (IaRTN 2019 Adjustment)
Ia. Regional Coordinate System Zone 01 (U.S. Survey Foot)
VERT. DATUM: NAVD88
Geoid Model: 2018u3

Point Name	Northing	Easting	Elevation	Feature Definition-Description
464	9541725.14	11652836.71	1189.01	CP FND PALO ALTO CO GPS CONTROL POINT DESIGNATION PA-0464 AS DESCRIBED IN GOOD CONDITION, LOCATED IN THE NE QUAD OF IA4 AND 420TH STREET
740041089	9546976.60	11652747.16	1200.42	CP FND IA DOT 4X4 CM 6IN ABOVE GROUND IN GOOD CONDITION, LOCATED ON EAST SIDE OF IA4 .5MI S OF IA4 AND 405TH STREET INTERSECTION
740041097	9550861.46	11652748.16	1193.52	CP FND IA DOT 4X4 CM 9IN ABOVE GROUND IN GOOD CONDITION, LOCATED ON EAST SIDE OF IA4 .25MI N OF IA4 AND 405TH STREET INTERSECTION
740041105	9554936.01	11652646.99	1194.13	CP FND IA DOT ROW RAIL 6IN ABOVE GROUND IN GOOD CONDITION SET DIMPLE IN WEB, LOCATED ON EAST SIDE OF IA4 .5MI N OF IA4 AND 400TH STREET INTERSECTION
A19	9565105.05	11663037.72	1222.99	CP FND NGS GPS CONTROL MON 2IN ABOVE GROUND DESIGNATION A19 AS DESCRIBED IN GOOD CONDITION, LOCATED IN THE SW QUAD OF 480TH AVE AND THE RAIL ROAD TRACKS INTERSECTION

108_23A
8/15/22

TRAFFIC CONTROL PLAN

IA 4 will remain open during construction via staging and signalization. Refer to traffic control notes and staging plans.

400th Street to be closed during construction.

The Contractor shall provide access to all entrances at all times.

STAGING NOTES

Stage 1a
Traffic:
Maintain one lane of alternating traffic on SB lane of IA 4 via flaggers.
Close NB Lane.
Close 400th St.

Construction:
(1) Pave proposed NB shoulders from BOP to 665+19.82.
(2) Pave proposed NB shoulders from 671+62.09 to EOP.

Stage 1b
Traffic:
Maintain one lane of alternating traffic on NB lane of IA 4 via flaggers.
Close SB Lane.
Close 400th St.

Construction:
(1) Pave proposed SB shoulders from BOP to 665+19.82.
(2) Pave proposed SB shoulders from 671+62.09 to EOP.

Stage 2
Traffic:
Maintain one lane of alternating traffic on SB lane of IA 4 via temporary traffic signals and TBR.
Close NB Lane.
Close 400th St.

Construction:
(1) Pave and Construct detour pavement and widen NB side of existing bridge.

Stage 3a
Traffic:
Maintain one lane of alternating traffic on NB lane of IA 4 via temporary traffic signals and TBR.
Close SB Lane.
Close 400th St.

Construction:
(1) Construct 21' of SB side of proposed bridge.
(2) Construct 21’ of SB bridge approach pavement on each side of bridge.
(3) Construct 9’ 5” of SB portion of pavement from 665+19.82 to the bridge approach.
(4) Construct SB shoulder from 665+19.82 to the bridge approach.
(5) Construct 9’ 5” of SB potion of pavement from the bridge approach to 671+62.09.
(6) Construct SB shoulder from the bridge approach to 671+62.09.

Stage 3b
Traffic:
Maintain one lane of alternating traffic on SB lane of IA 4 via temporary traffic signals and TBR.
Close NB Lane.
Close 400th St.

Construction:
(1) Construct remaining portion of bridge.
(2) Construct remaining portion of NB bridge approach pavement on each side of bridge.
(3) Construct remaining NB portion of pavement and shoulder from 665+19.82 to the bridge approach.
(4) Construct remaining NB portion of pavement and shoulder from the bridge approach to 671+62.09.

CROSS SECTION VIEW COLOR LEGEND OF TRAFFIC CONTROL AND STAGING SHEETS

SHADING	Design Color No.	
Green, Light	(225)	Existing Pavement Shading
Gray, Light	(48)	Previously Constructed Pavement Shading
Gray, Med	(80)	Previously Constructed Granular Surface Shading
Blue, Light	(230)	Proposed Pavement Shading
Lavender	(9)	Temporary Pavement Shading
Brown, Med	(237)	Future Proposed Pavement Shading

CROSS SECTION VIEW PATTERN AND SYMBOL LEGEND OF TRAFFIC CONTROL AND STAGING SHEETS

	Pavement Removal		Proposed Granular Shoulder
	Proposed Granular Subbase		Temporary Shoulder
	Proposed Special Backfill		Existing Shoulder Strengthening
	Temporary Barrier Rail		Permanent Barrier Rail
			Channelizing Device

PLAN VIEW COLOR LEGEND OF TRAFFIC CONTROL AND STAGING SHEETS

LINEWORK	Design Color No.	
Green	(2)	Existing Topographic Features and Labels
Magenta	(5)	Pavement Marking Call Outs
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Yellow	(4)	Pavement Markings, Yellow
Off White	(254)	Pavement Markings, White
Violet	(15)	Temporary barrier rail, Unpinned
Flush Orange	(228)	Temporary barrier rail, Pinned

SHADING	Design Color No.	
Green, Light	(225)	Existing Pavement Shading
Gray, Light	(48)	Previously Constructed Pavement Shading
Gray, Med	(80)	Proposed Granular Surface Shading
Gray, Med	(80)	Previously Constructed Granular Surface Shading
Blue, Light	(230)	Proposed Pavement Shading
Lavender	(9)	Temporary Pavement Shading
Brown, Light	(236)	Proposed Grading Limits Shading
Pink, Dark	(13)	Proposed MSE or CIP Wall Shading
Red	(3)	Proposed Bridge Shading and Sign Trusses
Black w/Gray, Light Fill	(0,48)	Previously Constructed Structure

PLAN VIEW PATTERN AND SYMBOL LEGEND OF TRAFFIC CONTROL AND STAGING SHEETS

●	Channelizing Device		Crash Cushion (Temp or Perm)
✕	Drum		Traffic Signal
◘	Temporary Lane Separator		Flagger
◆	Tubular Marker		Temporary Floodlighting
♦	Channelizer Marker		Traffic Sign
△	Concrete Barrier Marker		Type III Barricade
⊰	Delineator		Type A Warning Light
	Temporary Barrier Rail		Direction of Traffic
	Pavement Removal		Safety Closure
	Sand Barrel Layout	1	Lane Identification

NOTE: Device spacing according to Standard Road Plans unless specifically dimensioned.

TRAFFIC CONTROL AND STAGING LEGEND AND SYMBOL INFORMATION SHEET

(COVERS SHEET SERIES J)

661+00 662+00 663+00 664+00 665+00 666+00 667+00 668+00 669+00 670+00 671+00 672+00 673+00 674+00 675+00 676+00

Great Oak TWP.
T-95N R-33W
SEC. 12

Des Moines River

Temporary Traffic Signals

PC 662+02.18

STA 664+49.17 (ML004)
BEGIN TBR

STA 665+19.82 (ML004)
BEGIN CONSTRUCTION

Sta. 668+45.5
Skew 45° LT AH
320'x28' Continuous I-Beam Bridge
D.A.=2031 Sq. Mi.-F Plans

STA 671+62.09 (ML004)
END CONSTRUCTION

PC 672+59.16

STA 672+37.34 (ML004)
END TBR

Temporary Traffic Signals

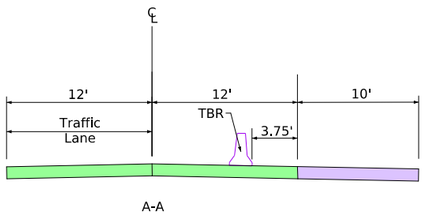
(Closed)
400th St.

Notes:
1) Refer to TC-217 for layout of advanced signing.
2) 400th St. to be closed during Construction, refer to TC-252 for layout of advances signing.

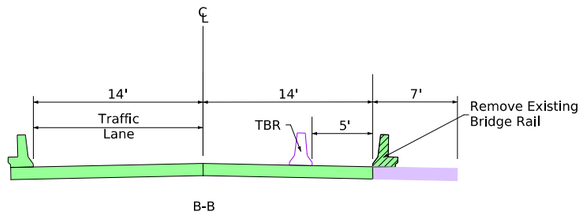
0 FEET 50

Nevada TWP.
T-95N R-32W
SEC. 7

STAGE 2



A-A



B-B

FILE NO. 32299	ENGLISH	DESIGN TEAM JIA / SCHOENROCK / RYAN	PALO ALTO COUNTY	PROJECT NUMBER BRF-004-5(51)--38-74	SHEET NUMBER J.4	

11:08:53 AM 10/4/2024 jryan3 pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Projects\7400402021\Design\CADD_Files\Sheet_Files\SHT_7400451_J03.dgn

661+00 662+00 663+00 664+00 665+00 666+00 667+00 668+00 669+00 670+00 671+00 672+00 673+00 674+00 675+00 676+00

Great Oak TWP.
T-95N R-33W
SEC. 12

Des Moines River

PT 662+02.18

STA 665+19.82 (ML004)
BEGIN CONSTRUCTION

Place Proposed Guadrail

Temporary Traffic Signals

STA 663+65.01 (ML004)
BEGIN TBR

STA 665+09.10 (ML004)
BEGIN TBR

(Remove SB portion of Bridge)
Sta. 668+45.5
Skew 45° LT AH
320'x28' Continuous I-Beam Bridge
D.A.=2031 Sq. Mi.-F Plans

STA 671+46.60 (ML004)
END TBR

Place Proposed Guadrail

STA 671+62.09 (ML004)
END CONSTRUCTION

PC 673+59.16

Temporary Traffic Signals

STA 673+17.00 (ML004)
END TBR

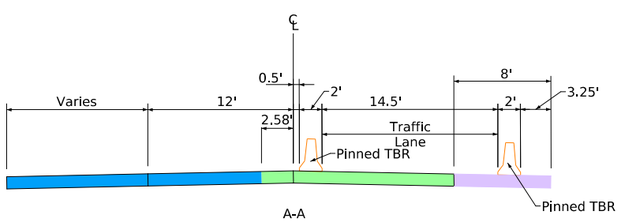
(Closed)
400th St.

Notes:
1) Refer to TC-217 for layout of advanced signing.
2) 400th St. to be closed during Construction, refer to TC-252 for layout of advanced signing.

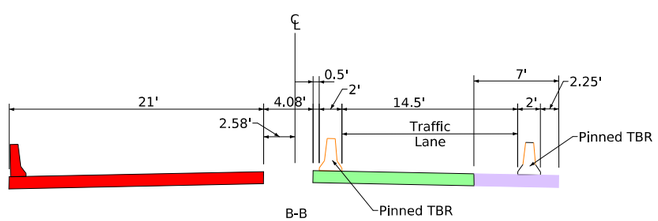
0 50
FEET

Nevada TWP.
T-95N R-32W
SEC. 7

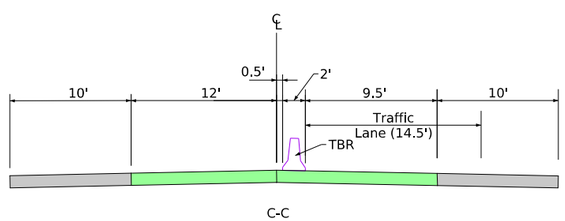
STAGE 3a



A-A



B-B



C-C

FILE NO. 32299	ENGLISH	DESIGN TEAM JIA / SCHOENROCK / RYAN	PALO ALTO COUNTY	PROJECT NUMBER BRF-004-5(51)--38-74	SHEET NUMBER J.5

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661+00 662+00 663+00 664+00 665+00 666+00 667+00 668+00 669+00 670+00 671+00 672+00 673+00 674+00 675+00 676+00

PT 662+02.18

PC 673+59.16

STA 665+19.82 (ML004)
BEGIN CONSTRUCTION

STA 671+62.09 (ML004)
END CONSTRUCTION

Temporary Traffic Signals

Temporary Traffic Signals

Place Proposed Guardrail

Place Proposed Guardrail

STA 664+48.79 (ML004)
BEGIN TBR

STA 672+38.28 (ML004)
END TBR

(Remove NB portion of Bridge)
Sta. 668+45.5
Skew 45° LT AH
320'x28' Continuous I-Beam Bridge
D.A.=2031 Sq. MI.-F Plans

Great Oak TWP.
T-95N R-33W
SEC. 12

Des Moines River

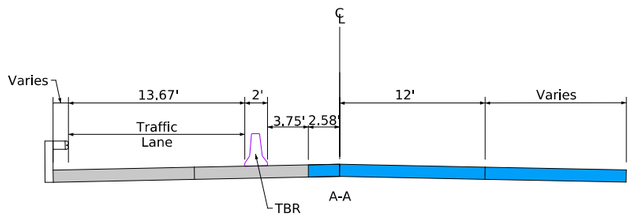
(Closed)
400th St.

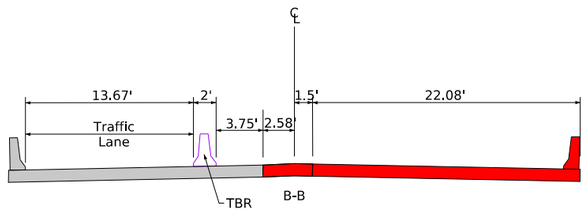
Nevada TWP.
T-95N R-32W
SEC. 7

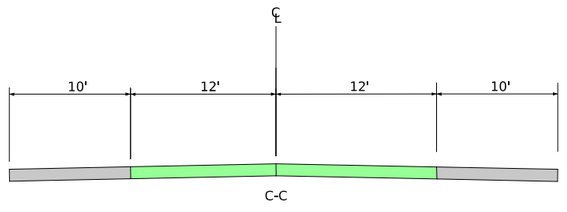
0 50
FEET

Notes:
1) Refer to TC-217 for layout of advanced signing
2) 400th St. to be closed during Construction, refer to TC-252 for layout of advanced signing.

STAGE 3b







FILE NO. 32299	ENGLISH	DESIGN TEAM JIA / SCHOENROCK / RYAN	PALO ALTO COUNTY	PROJECT NUMBER BRF-004-5(51)--38-74	SHEET NUMBER J.6	

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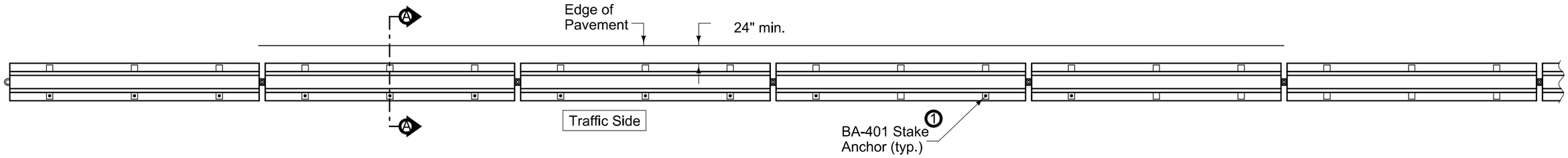
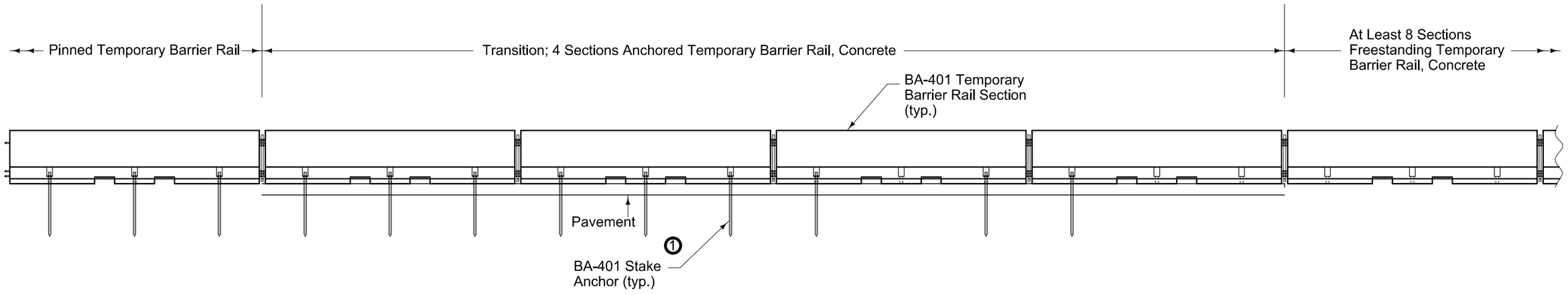
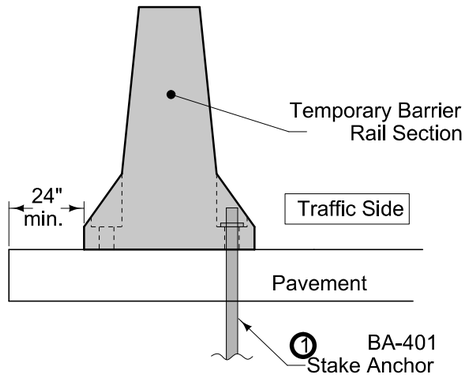


PLAN



ELEVATION



SECTION A-A

Install temporary barrier rail on a flat, level surface. Where anchored TBR sections are not located on existing pavement, construct a 2 inch minimum thickness HMA pad.

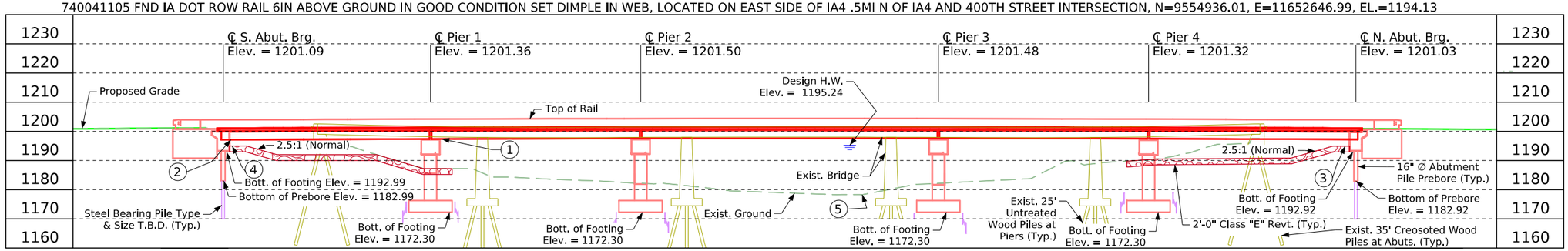
① Each transition requires nine (9) BA-401 stake anchors as shown. Use of the strap anchorage is not allowed in transition. When transition is placed on Composite or PCC Pavement pre-drill holes for stakes with 1⅝ inch core bit.

Transition from Pinned TBR to Unpinned TBR

FILE NO. 32299	ENGLISH	DESIGN TEAM JIA / SCHOENROCK / RYAN	PALO ALTO COUNTY	PROJECT NUMBER BRF-004-5(51)--38-74	SHEET NUMBER U.1

4:33:32 PM 9/19/2024 jryan3 pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Projects\7400402021\Design\CADD_Files\Sheet_Files\SHT_7400451_U01.dgn

Control Point: 740041097 FND IA DOT 4X4 CM 9IN ABOVE GROUND IN GOOD CONDITION, LOCATED ON EAST SIDE OF IA4 .25MI N OF IA4 AND 405TH STREET INTERSECTION, N=9550861.46, E=11652748.16, EL.=1193.52
740041105 FND IA DOT ROW RAIL 6IN ABOVE GROUND IN GOOD CONDITION SET DIMPLE IN WEB, LOCATED ON EAST SIDE OF IA4 .5MI N OF IA4 AND 400TH STREET INTERSECTION, N=9554936.01, E=11652646.99, EL.=1194.13



0.63 %
-0.66 %

VPI Sta. = 668+45.50
VPI Elev. = 1202.40
L = 525'

Proposed Profile Grade IA 4

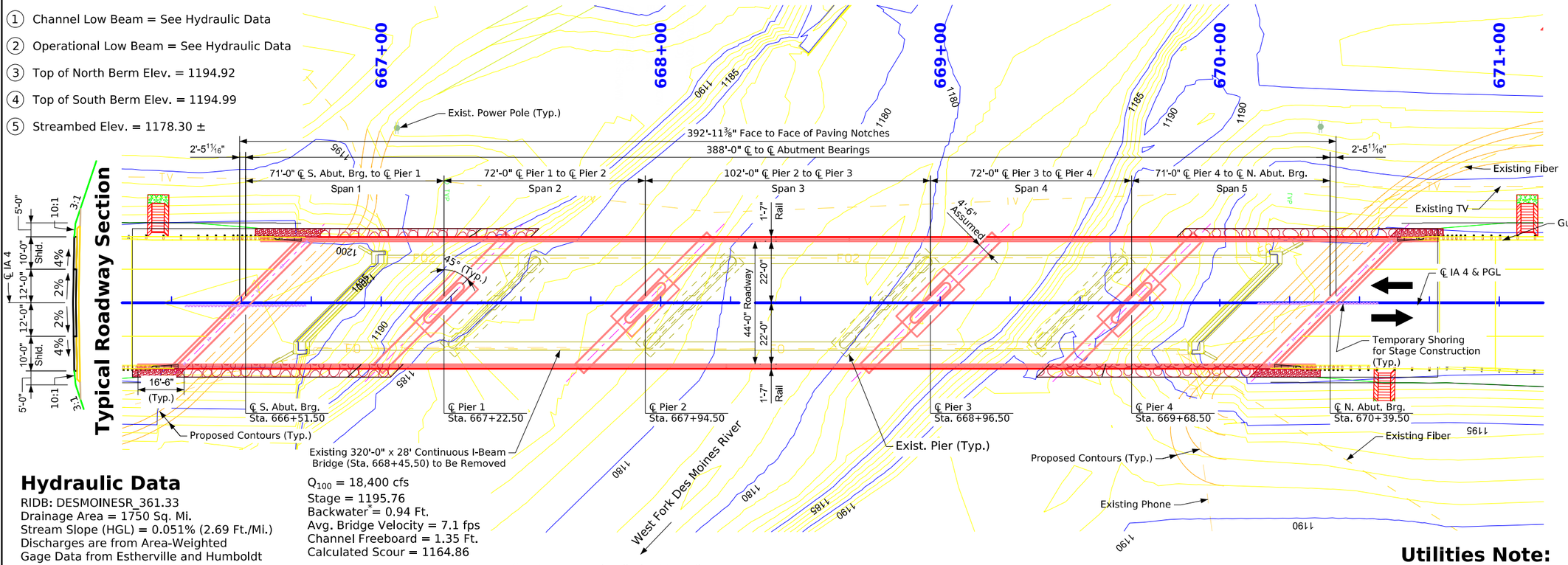
(1) Channel Low Beam = See Hydraulic Data

(2) Operational Low Beam = See Hydraulic Data

(3) Top of North Berm Elev. = 1194.92

(4) Top of South Berm Elev. = 1194.99

(5) Streambed Elev. = 1178.30 ±



Typical Roadway Section

Hydraulic Data

RIDB: DESMOINESR_361.33
Drainage Area = 1750 Sq. Mi.
Stream Slope (HGL) = 0.051% (2.69 Ft./Mi.)
Discharges are from Area-Weighted
Gage Data from Estherville and Humboldt

Channel Low Beam = 1197.11
Operational Low Beam = 1196.81
Avg. Low Water Stage = 1183.8
Extreme Highwater = Unknown
Roadway Overtop El. = 1196.65
Roadway Overtopping Sta. ~ 682.00 to 726+00
0.2 Mi. to 1.0 Mi. North of Crossing

Q_{25} = 12,400 cfs
Stage = 1194.52

Q_{50} (Design) = 15,200 cfs
Stage = 1195.16
Backwater* = 0.63 Ft.
Avg. Bridge Velocity = 6.3 fps
Channel Freeboard = 1.95 Ft.

Q_{100} = 18,400 cfs
Stage = 1195.76
Backwater* = 0.94 Ft.
Avg. Bridge Velocity = 7.1 fps
Channel Freeboard = 1.35 Ft.
Calculated Scour = 1164.86

Q_{200} = 21,800 cfs
Stage = 1196.33
Backwater = 0.75 Ft.
Avg. Bridge Velocity = 6.9 fps
Operational Freeboard = 0.78 Ft.
Calculated Scour = 1164.51

Q_{500} = 26,600 cfs
Stage = 1197.05
Backwater = 0.41 Ft.
Avg. Bridge Velocity = 6.4 fps
Channel Freeboard = 0.06 Ft.

*Does not include additional upstream floodplain conveyance restrictions causing additional headwater (Prior to or during shallow roadway overtopping).

South overtopping limited by adjacent upstream driveway.

Existing bridge north overtopping frequency is a 25-yr from upstream northwest floodplain conveyance backwater restrictions causing additional headwater.

Bridge is located ~200 Ft. downstream of a FEMA Zone AE (flood elevations determined)
Located within Palo Alto County F.I.S. dated Oct. 7, 2021
F.I.S. Base Flood = 23,300 cfs
This Project meets a floodway no-rise condition.

The bridge will be designed to withstand the applicable effects of ice and horizontal stream loads and uplift forces associated with the Q_{100}.

Situation Plan

0 20
Scale In Feet

Location

IA 4 over West Fork
Des Moines River
T-95N R-32 & 33W
Section 7 & 12
Great Oak & Nevada Township
Palo Alto County
FHWA No. 39220 (Existing)
FHWA No. 39221 (Proposed)
Bridge Maint. No. 7409.9S004
Latitude 43.065829°
Longitude -94.679033°

Hydraulic Design

LICENSED PROFESSIONAL ENGINEER
Brian J. Birkland
17375
IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature Brian J. Birkland 9-9-2024 Date

Printed or Typed Name Brian J. Birkland

My license renewal date is December 31, 2024

Pages or sheets covered by this seal: V.1-V.3

Traffic Data

2026 AADT 2,800 V.P.D.
TRUCKS 13 %

Utilities Note:

Utilities shown on this sheet are for information only. See Road Design sheets for utility information.

General Utility Symbols:

FO - Fiber Optic Line
T - Telephone Line
TV - Television

Preliminary

Design For 45 Degree Skew (LA)

388'-0" x 44'-0" Pretensioned Prestressed Concrete Beam Bridge

71'-0" End Spans BTB Beams 72'-0" & 102'-0" Interior Span

Situation Plan

STA. 668+45.50 (IA 4) Turn-in Date: June, 2024

Palo Alto County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 127 Design Sheet No. 1 of 3 FHWA No. 39221

FILE NO. 32299	ENGLISH	DESIGN TEAM WHKS & Co.	Palo Alto COUNTY	PROJECT NUMBER BRF-004-5(51)--38-74	SHEET NUMBER V.1

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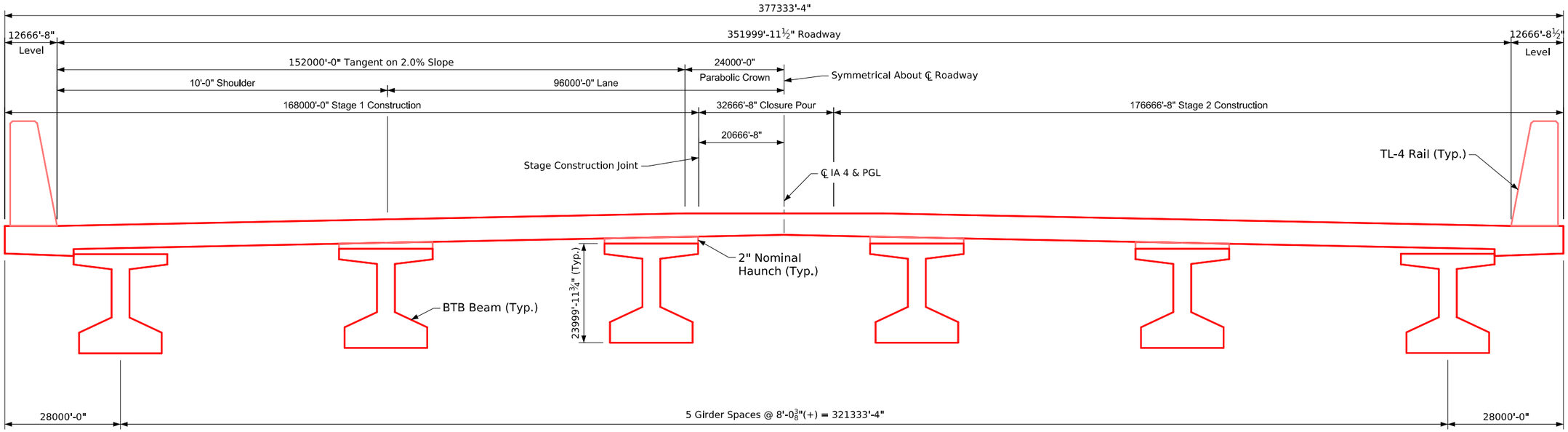


Transverse Section

(Looking North)

General Notes:

--This design is for the replacement of the existing 320'-0" x 28'-0" Continuous I-Beam Bridge, Palo Alto County Design 857, FHWA No. 39220, Maint. No. 7409.9S004.

Design Notes:

--TL-4 Bridge Railing Proposed
--Pier type - T-Piers Assumed Width 4'-6"
--Non-standard abutment width required due to skew. 3'-6" nominal width assumed (normal to skew).
--An Iowa DNR Flood Plain Permit is required. Preliminary Design will submit the application and place the permit in the PW Regulatory_Permits subdirectory folder upon receipt.
--An Iowa DNR Sovereign Lands Permit is required.
--As this project requires a Soverign Lands Permit, bid item reference notes shall restrict broken concrete as a substitute for revetment (BDM 3.2.7.3.5)
--Requirements for state water trail or paddling route are applicable. Signage, plan notes and bid items shall be addressed by the Design Bureau and included in the road plans.
--Non-Standard Abutment Wing Walls Required (See lengths on Situation Plan)
--Final Design shall consider the need for temporary shoring to accommodate staging of the bridge construction and include in the final plans as necessary.

--The bridge does not meet Iowa DOT's desired 50-yr 3-foot operational freeboard per BDM 3.2.2.4. Rationale:

-The proposed bridge provides channel freeboard greater than zero for the 500-yr event.

-Road grade overflow readily provides relief in the event the bridge opening is obstructed.

-Ice or debris is not expected to be a problem.

-Increasing the freeboard would require raising the roadway profile grade such that road grade overflow relief would be diminished, and headwater elevations would increase adjacent to an upstream FEMA floodway Zone 'AE' (with flood elevations determined) and upstream residences.

Plan Notes:

--Top of bridge deck at centerline roadway is 0.03' below the profile grade to account for deck cross slope and parabolic crown.
--Class E revetment stone is embedded.
--The bridge will be designed to withstand the applicable effects of ice and the horizontal stream loads and uplift forces associated with the Q_{100} flood.

Preliminary

Design For 45 Degree Skew (LA)

388'-0" x 44'-0" Pretensioned Prestressed Concrete Beam Bridge

71'-0" End Spans | BTB Beams | 72'-0" & 102'-0" Interior Span

Situation Plan - Misc.

STA. 668+45.50 (IA 4)

Turn-in Date: June, 2024

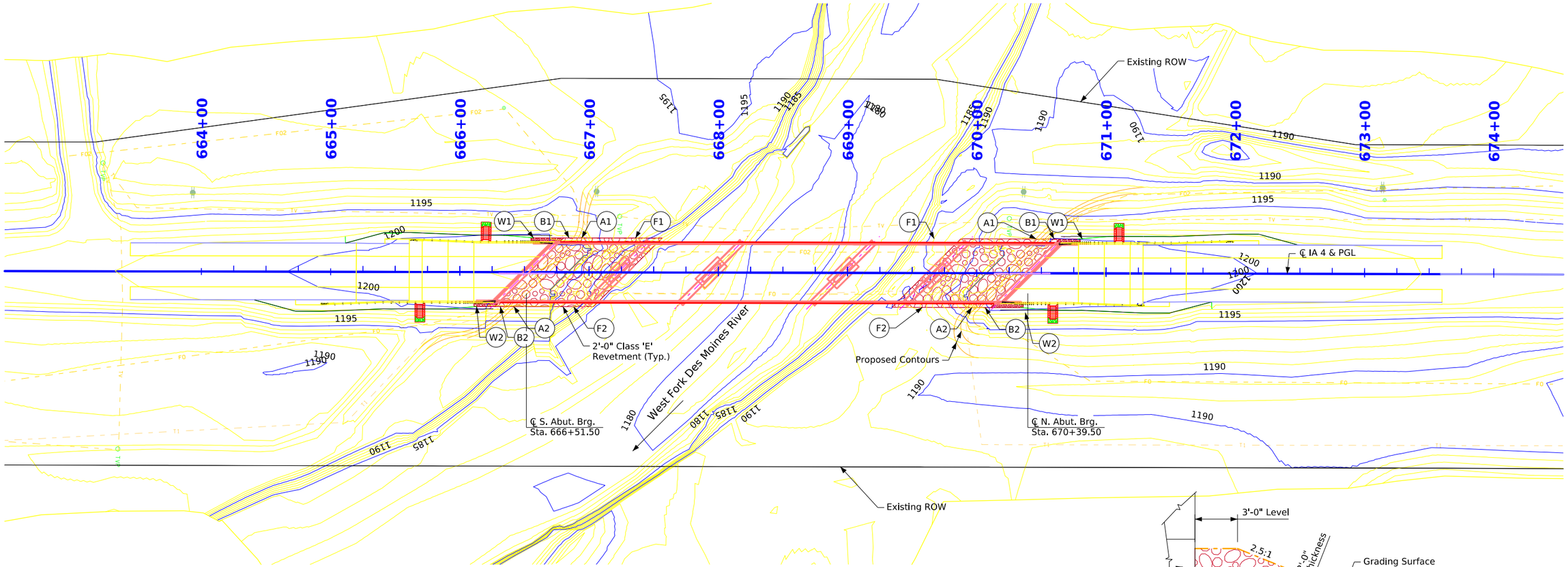
Palo Alto County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 127 | Design Sheet No. 2 of 3 | FHWA No. 39221

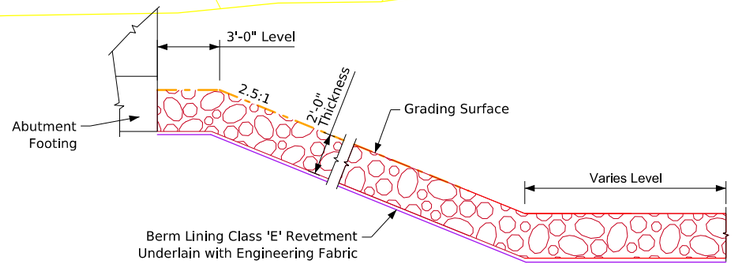
FILE NO. 32299	ENGLISH	DESIGN TEAM WHKS & Co.	Palo Alto COUNTY	PROJECT NUMBER BRF-004-5(51)--38-74	SHEET NUMBER V.2	

Control Point: 740041097 FND IA DOT 4X4 CM 9IN ABOVE GROUND IN GOOD CONDITION, LOCATED ON EAST SIDE OF IA4 .25MI N OF IA4 AND 405TH STREET INTERSECTION, N=9550861.46, E=11652748.16, EL.=1193.52
740041105 FND IA DOT ROW RAIL 6IN ABOVE GROUND IN GOOD CONDITION SET DIMPLE IN WEB, LOCATED ON EAST SIDE OF IA4 .5MI N OF IA4 AND 400TH STREET INTERSECTION, N=9554936.01, E=11652646.99, EL.=1194.13



Site Plan

0 40
Scale In Feet



Section Thru Embedded Berm Lining

Normal to Berm Slope

Preliminary

Berm Slope Location Table

Points	South Abutment			North Abutment		
	Station	Offset	Elev.	Station	Offset	Elev.
A1	666+94.33	26.58' Lt.	1192.00	670+45.86	26.58' Lt.	1191.00
A2	666+41.85	26.58' Rt.	1192.00	669+69.25	26.58' Rt.	1191.00
B1	666+84.45	26.58' Lt.	1194.99	670+59.72	26.58' Lt.	1194.92
B2	666+31.28	26.58' Rt.	1194.99	670+06.55	26.58' Rt.	1194.92
F1	667+35.85	26.58' Lt.	1192.00	669+66.93	26.58' Lt.	1191.00
F2	666+88.01	26.58' Rt.	1192.00	669+57.82	26.58' Rt.	1191.00
W1	666+57.00	26.58' Lt.	1200.56	670+78.00	26.58' Lt.	1200.26
W2	666+13.00	26.58' Rt.	1200.33	670+34.00	26.58' Rt.	1200.50

Berm slope elevations reflect the grading surface.

Estimated Berm Armoring Quantities

Location	Revetment CL. E (Ton)	Engineering Fabric (SY)	CL. 10 Channel Excavation (CY)
South Abutment Berm	485.9	522.9	303.7
North Abutment Berm	487.4	524.3	304.7
Totals	973.3	1047.2	608.4

Excavation quantity calculated from grading surface. Excavation quantity is for embedded revetment core out only, and does not include excavation to the grading surface. Excavation quantity to the grading surface is determined by Road Design and included in the Road Plans.

Design For 45 Degree Skew (LA)

388'-0" x 44'-0" Pretensioned Prestressed Concrete Beam Bridge

71'-0" End Spans | BTB Beams | 72'-0" & 102'-0" Interior Spans

Site Plan

STA. 668+45.50 (IA 4)

Turn-in Date: June, 2024

Palo Alto County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 127 | Design Sheet No. 3 of 3 | FHWA No. 39221

CROSS SECTION VIEW COLOR LEGEND

Design Color No.	Feature
Aggregate	
(64)	Choke Stone
(42)	Engineering Fabric
(8)	Flooded Backfill
(92)	Macadam Stone
(20)	Modified
(12)	Plowing Shaping
(14)	Porous Backfill
(8)	Revetment Class A
(6)	Revetment Class B
(62)	Revetment Class C
(188)	Revetment Class D
(28)	Revetment Class E
(12)	Shoulder Special Backfill
(12)	Special Backfill
(20)	Subbase
(20)	Subbase Lower
(20)	Subbase Upper
(118)	Subgrade Treatment
Asphalt	
(207)	HMA Base Course
(207)	HMA Interim Course
(207)	HMA Surface Course
Concrete	
(0)	Barrier Concrete
(0)	Barrier Concrete Footing
(0)	Curb Gutter
(48)	Flowable Mortar
(0)	Median Concrete
(0)	PCC Pavement
(0)	Sidewalk
Shoulder	
(209)	Shoulder HMA
(0)	Shoulder PCC
(6)	Shoulder Granular
Existing	
(0)	Existing Pavement
Structural	
(112)	Noise Wall
(112)	Noise Wall Footing
(112)	Retaining Wall Back
(112)	Retaining Wall Back Excavate
(112)	Retaining Wall Face
(112)	Retaining Wall Front Excavate
(112)	Retaining Wall Front Footing
(112)	Retaining Wall MSE Gutter
(112)	Retaining Wall Reinforced Earth
Grading	
(8)	Behind Curb Cut
(6)	Granular
(13)	Granular Back Fill
(48)	Rock Undercut
(8)	Shoulder Earth Fill
(2)	Side Slopes
(226)	Side Slopes Dressing
Substrata	
(128)	Boulder Substrata
(48)	Broken Weathered Substrata
(3)	Core Out Substrata
(203)	Existing Pavement Substrata
(6)	Loam Substrata
(80)	Rock Substrata
(4)	Select Sand Substrata
(3)	Shale Substrata
(10)	Topsoil Substrata
Unsuitable / Waste	
(3)	Unsuitable Type A
(13)	Unsuitable Type B
(11)	Unsuitable Type C
(3)	Waste

NOTES:

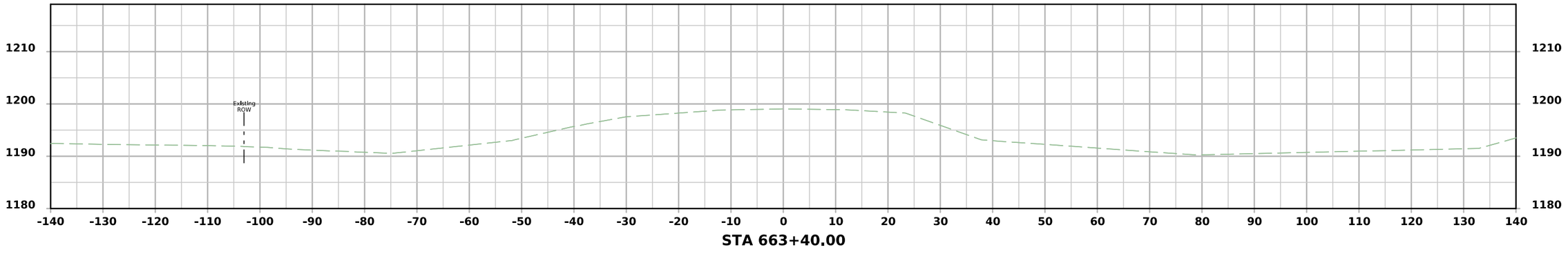
Text

NOTES:

Text

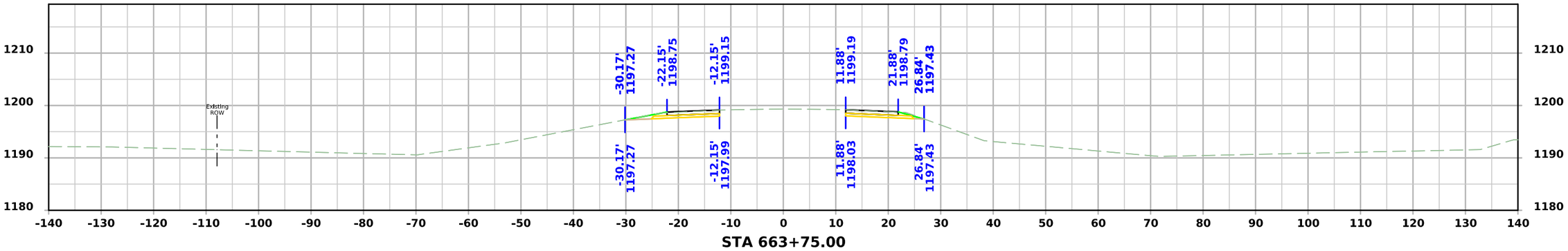
CROSS SECTIONS
LEGEND AND INFORMATION SHEET

(COVERS SHEET SERIES W, X, Y, & Z)



FILE NO. 32299	ENGLISH	DESIGN TEAM JIA / SCHOENROCK / RYAN	PALO ALTO COUNTY	PROJECT NUMBER BRF-004-5(51)--38-74	SHEET NUMBER W.2	

IA 4



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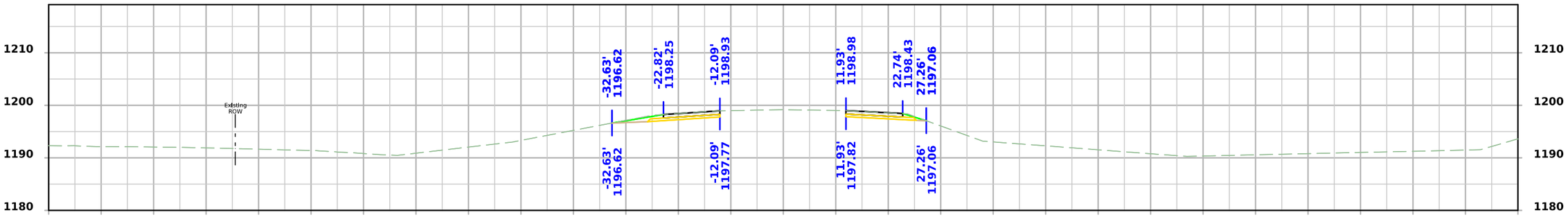

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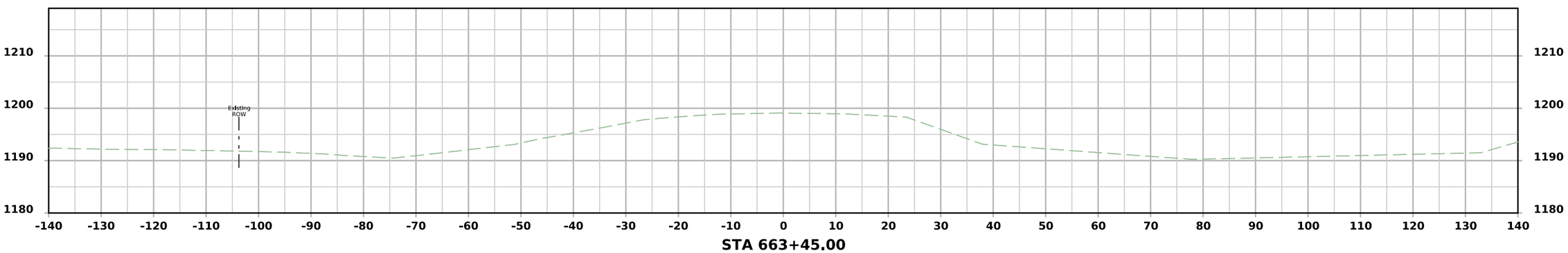

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FILE NO. 32299	ENGLISH	DESIGN TEAM JIA / SCHOENROCK / RYAN	PALO ALTO COUNTY	PROJECT NUMBER BRF-004-5(51)--38-74	SHEET NUMBER W.3

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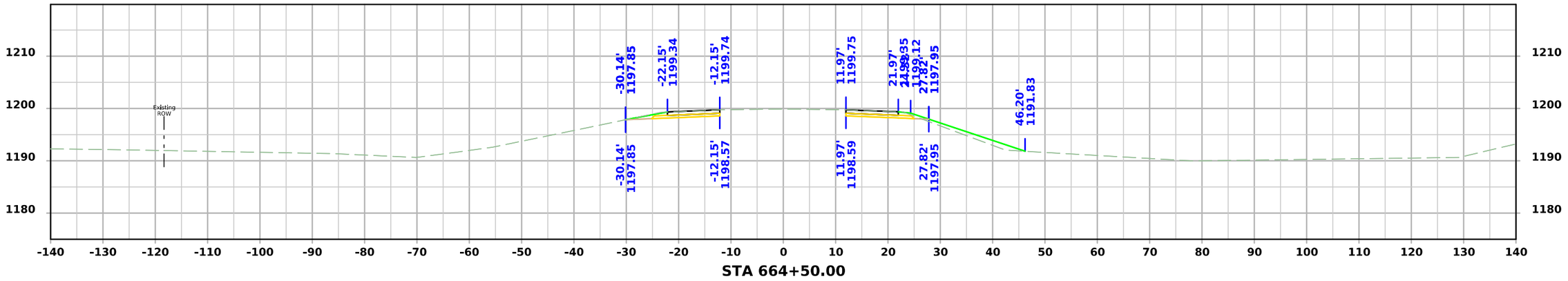

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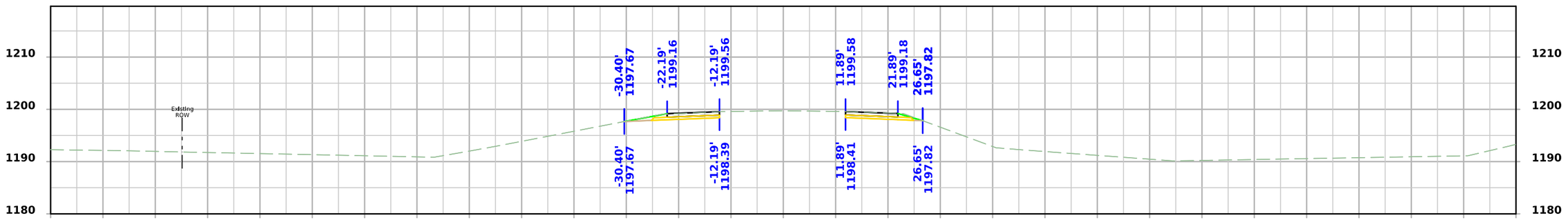

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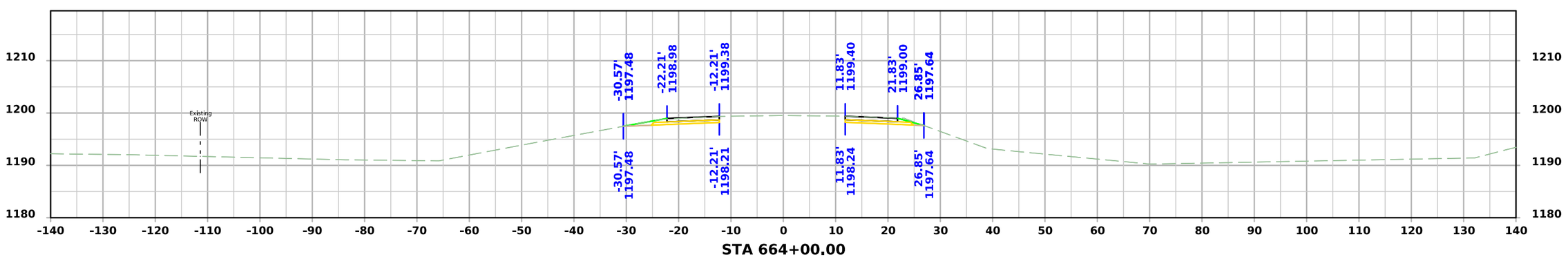

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FILE NO. 32299	ENGLISH	DESIGN TEAM JIA / SCHOENROCK / RYAN	PALO ALTO COUNTY	PROJECT NUMBER BRF-004-5(51)--38-74	SHEET NUMBER W.4

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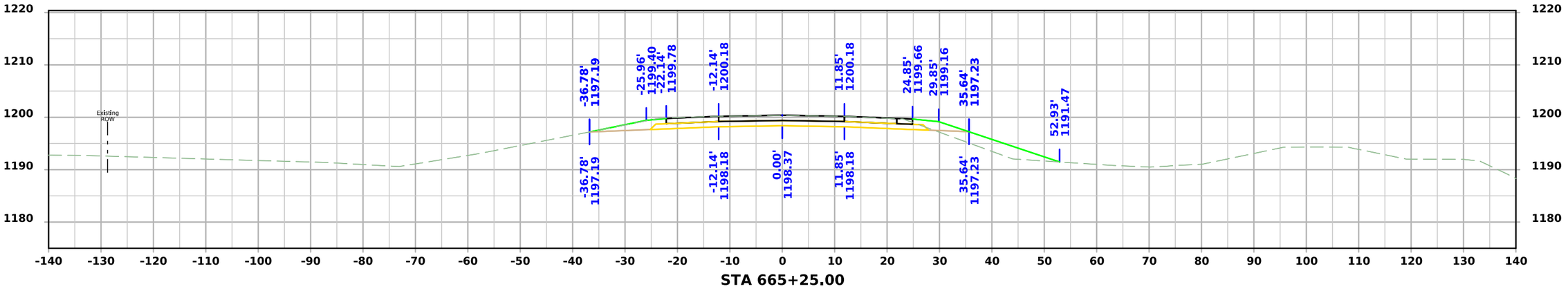

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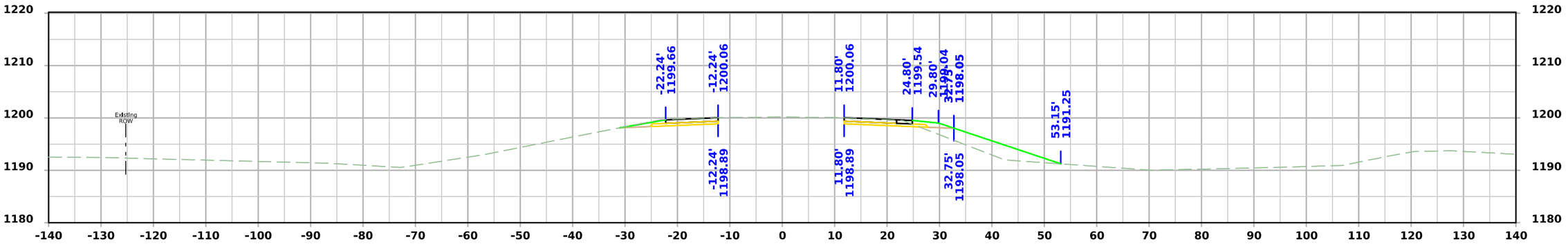

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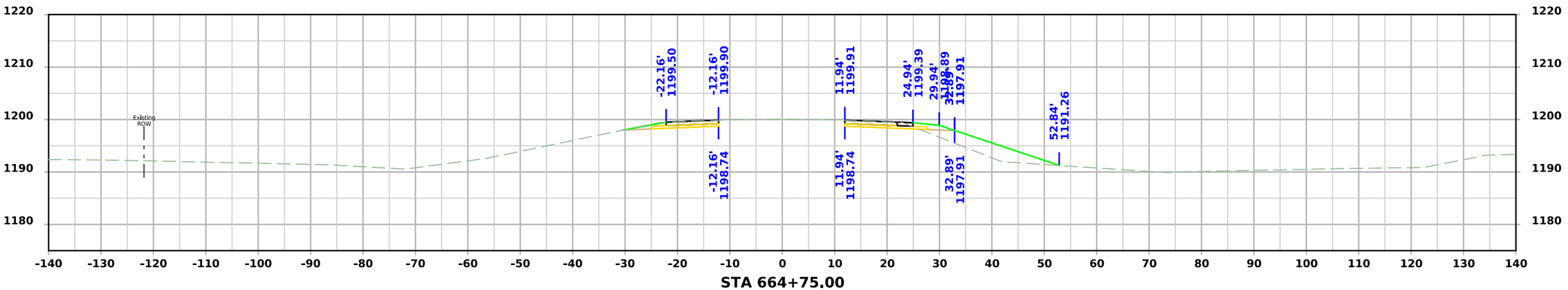

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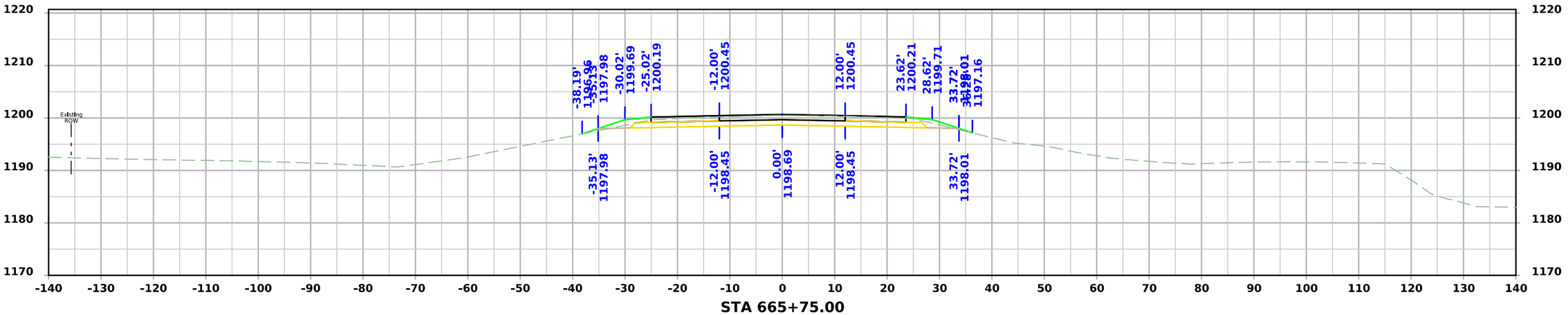
IA 4



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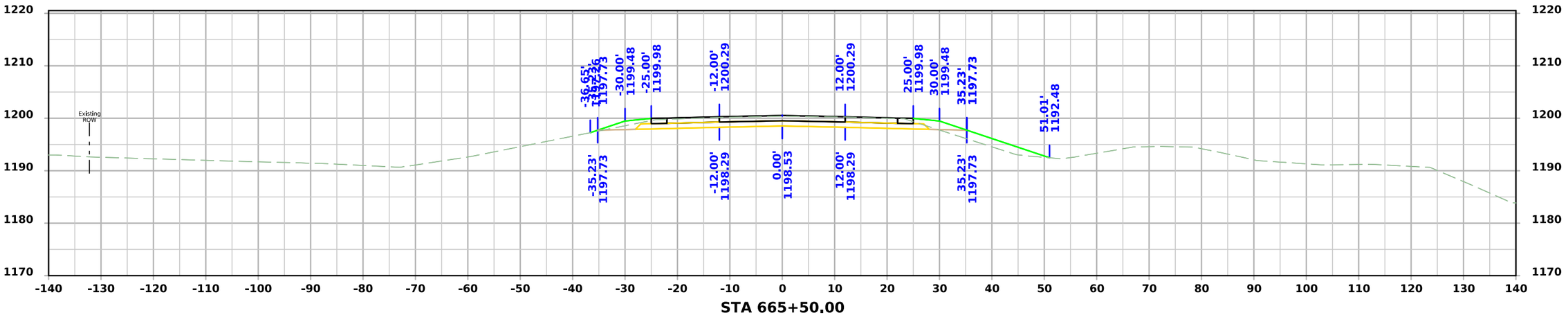

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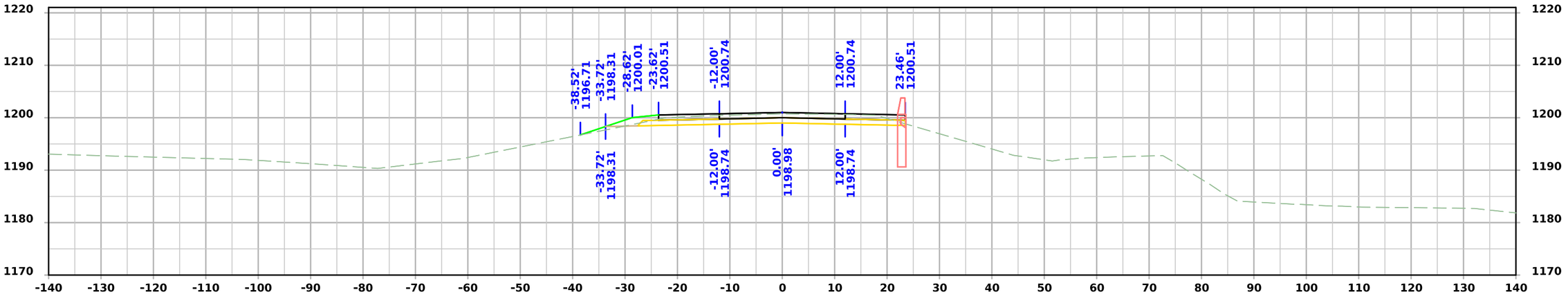
IA 4



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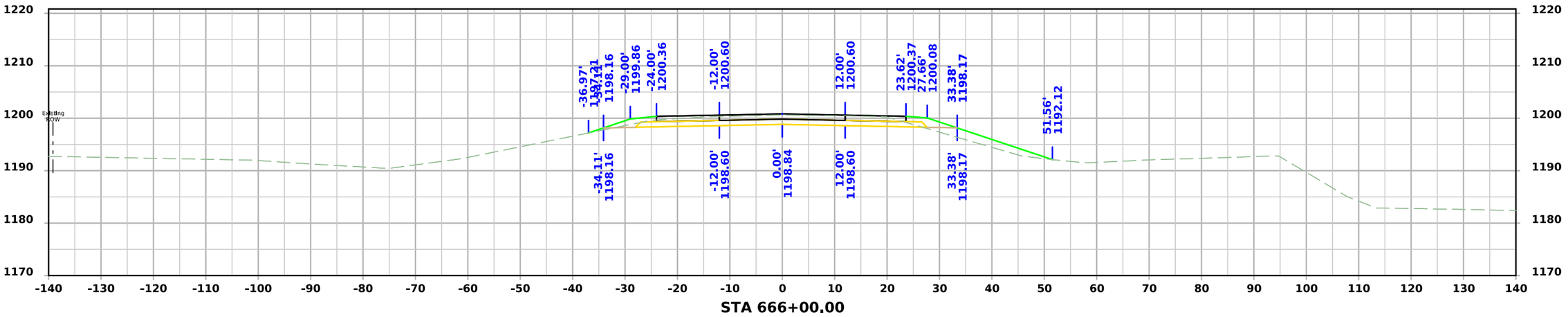

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FILE NO. 32299	ENGLISH	DESIGN TEAM JIA / SCHOENROCK / RYAN	PALO ALTO COUNTY	PROJECT NUMBER BRF-004-5(51)--38-74	SHEET NUMBER W.7

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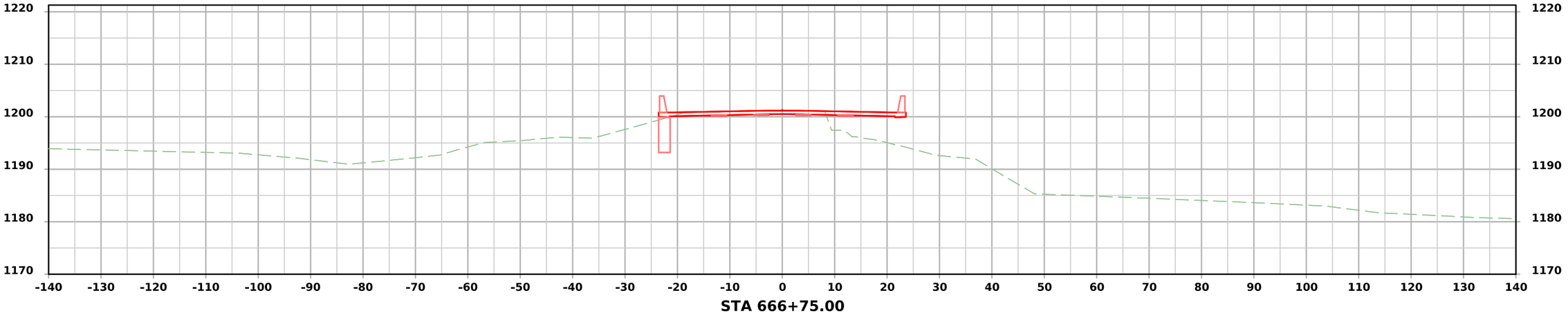

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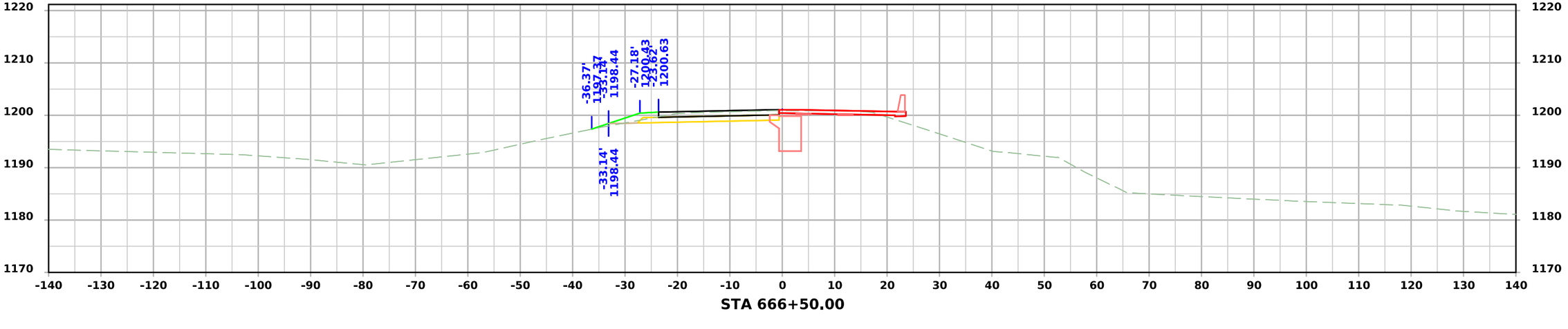

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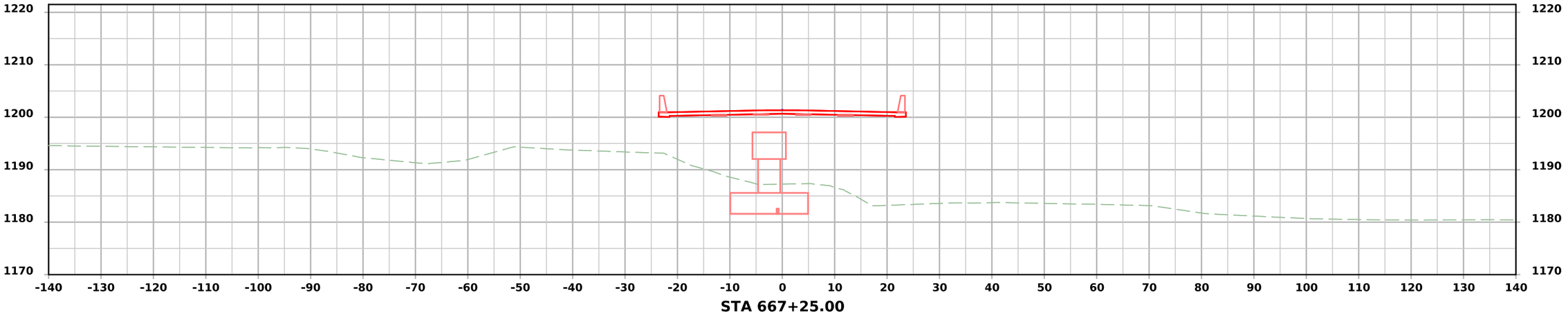

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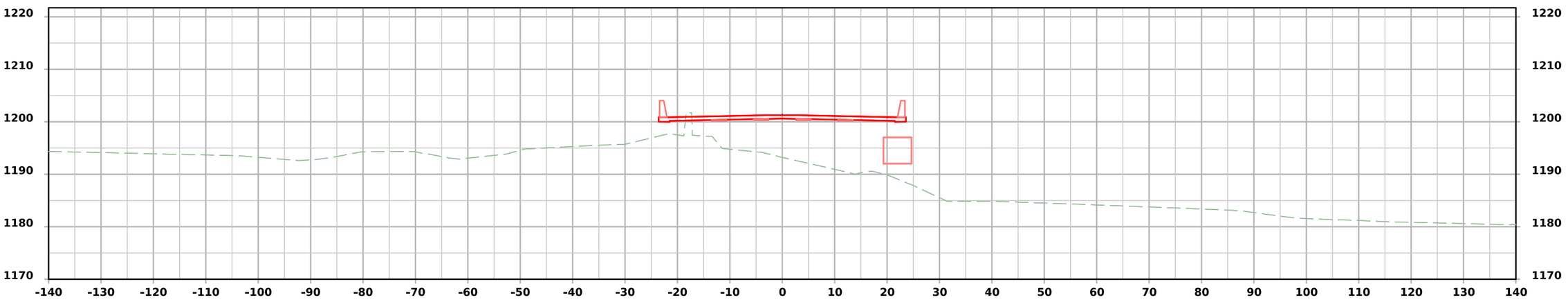

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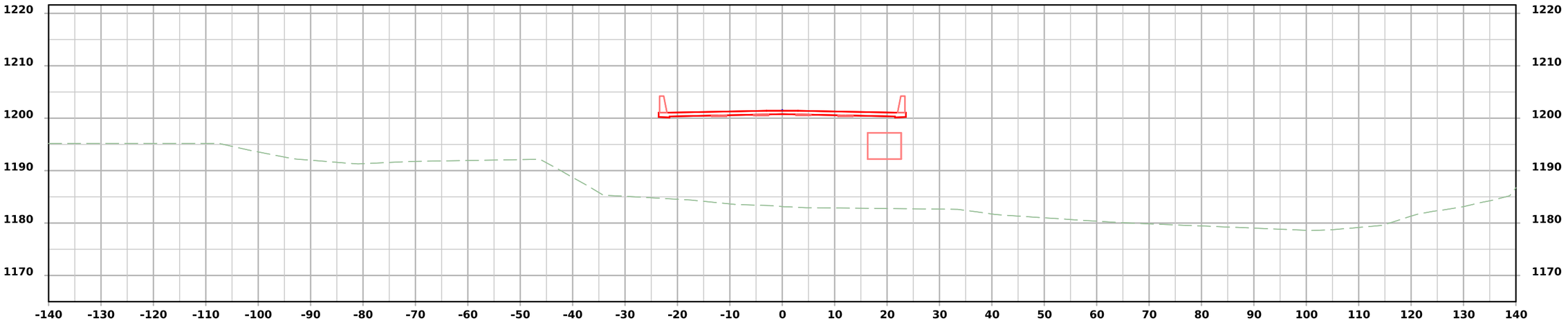

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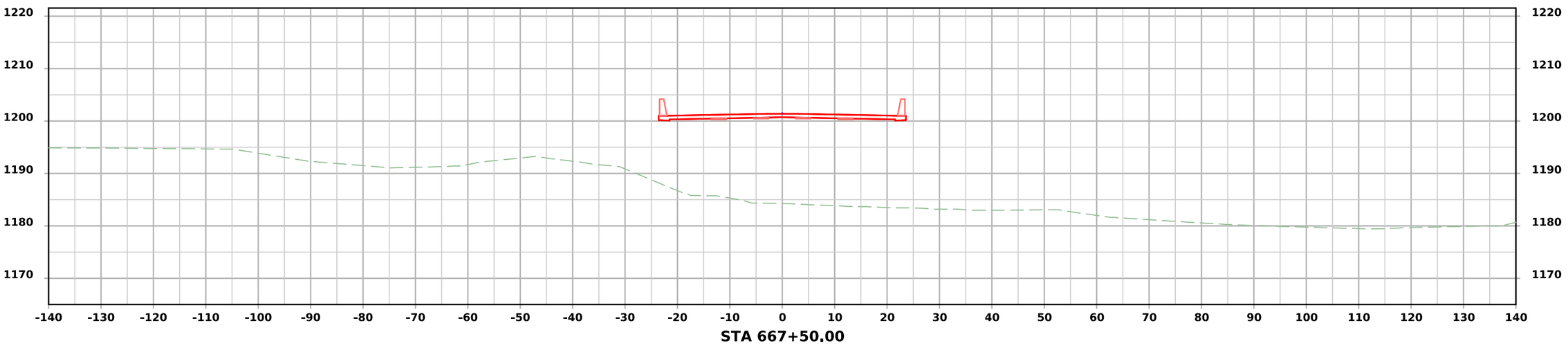

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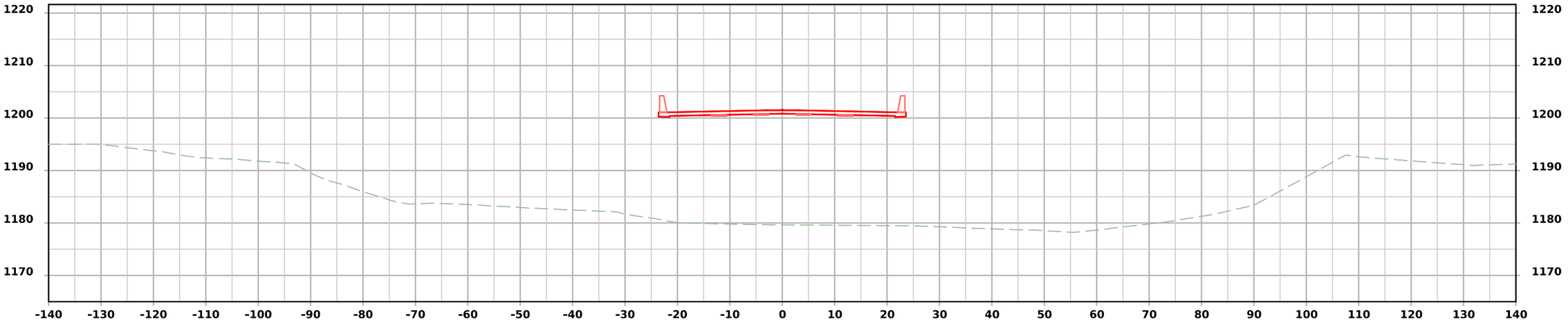

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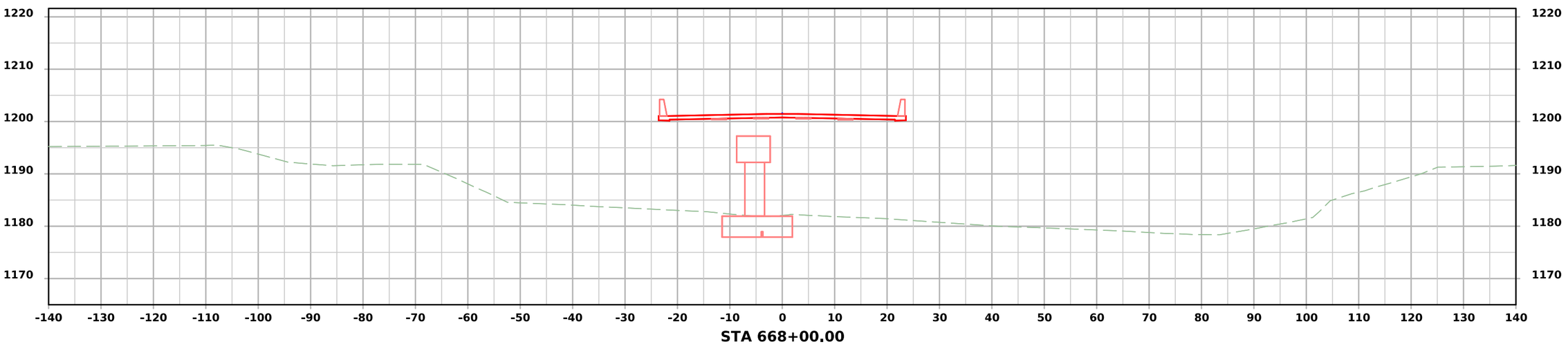

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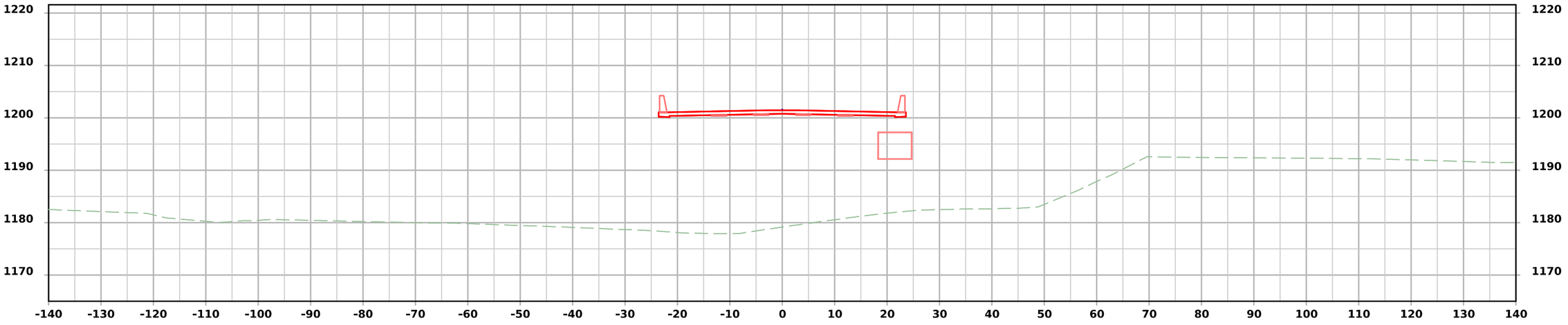
IA 4



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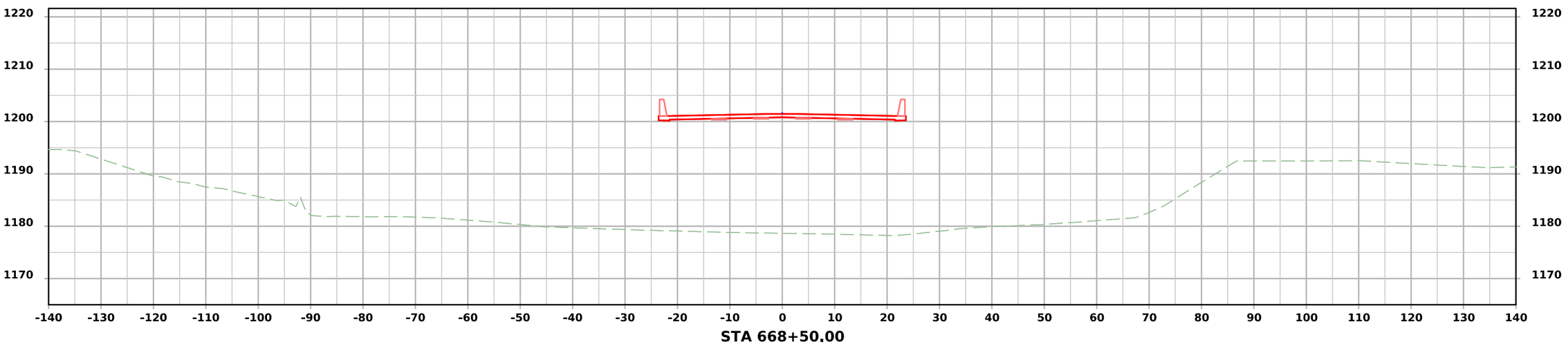

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FILE NO. 32299	ENGLISH	DESIGN TEAM JIA / SCHOENROCK / RYAN	PALO ALTO COUNTY	PROJECT NUMBER BRF-004-5(51)--38-74	SHEET NUMBER W.12

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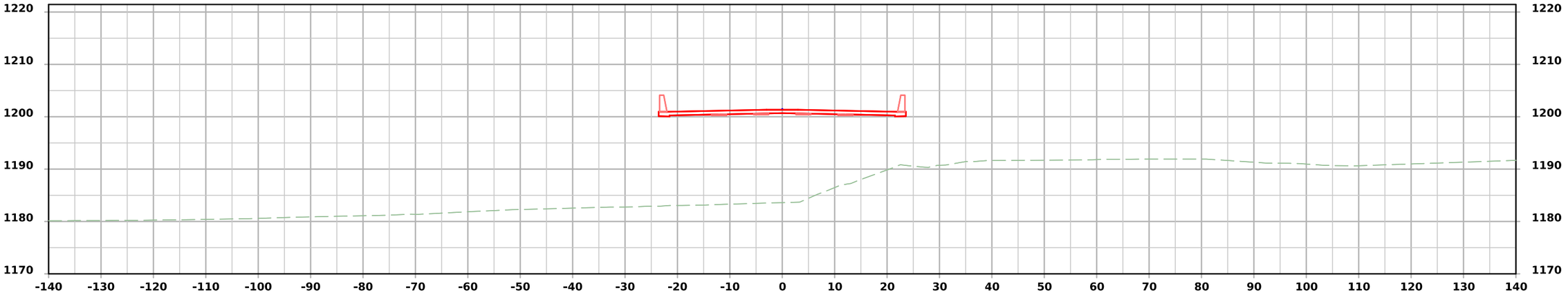

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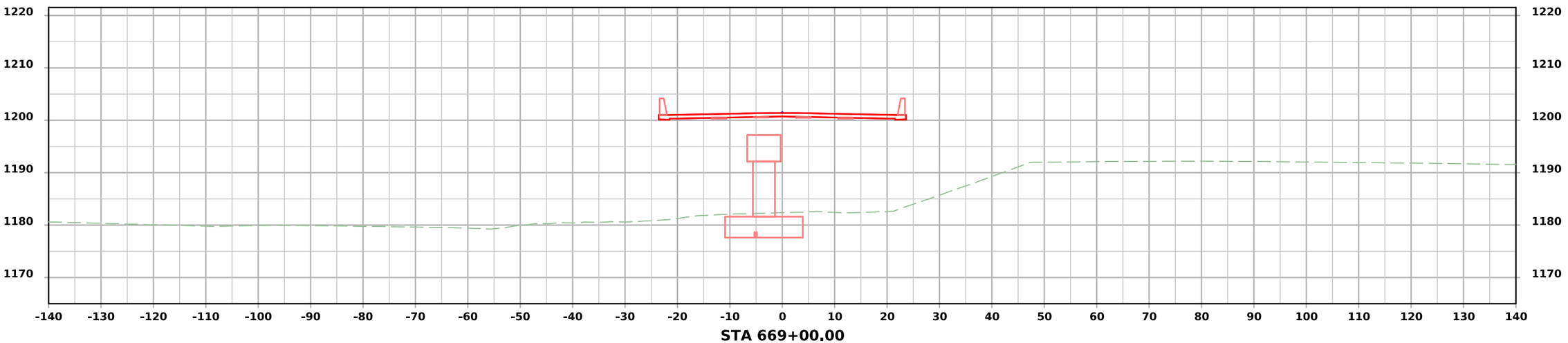

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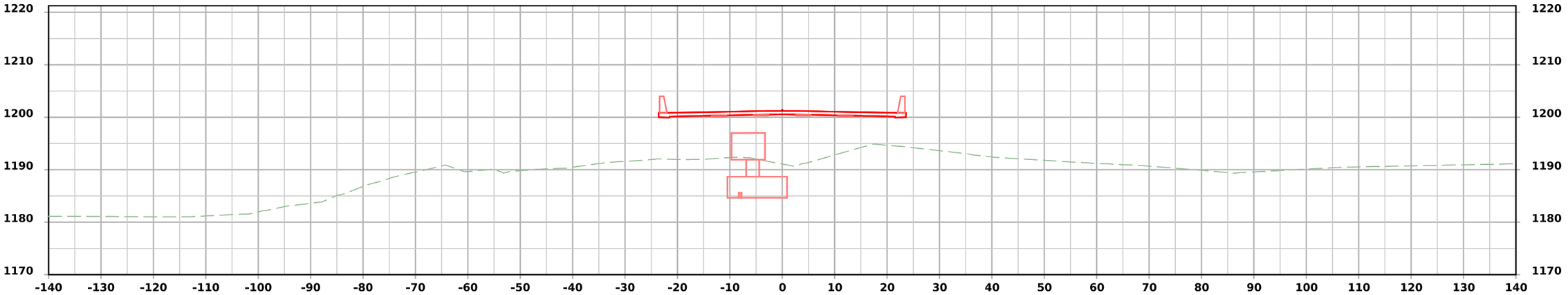

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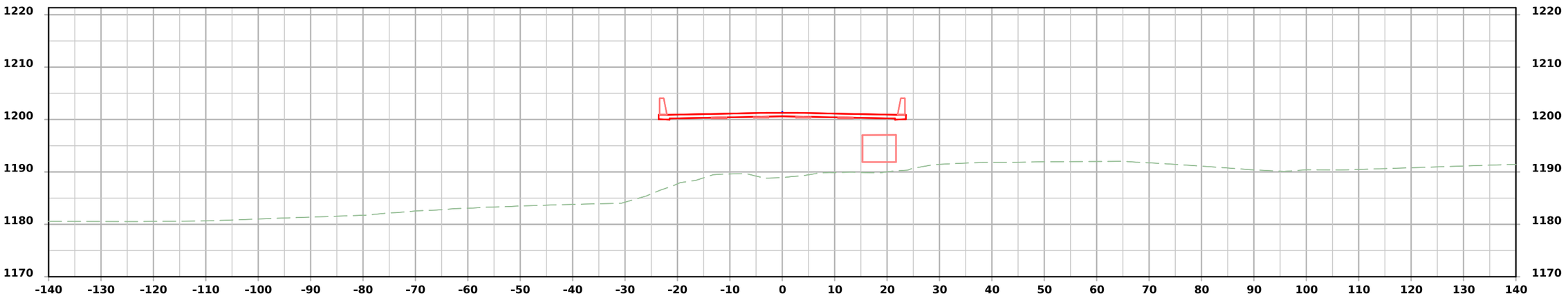

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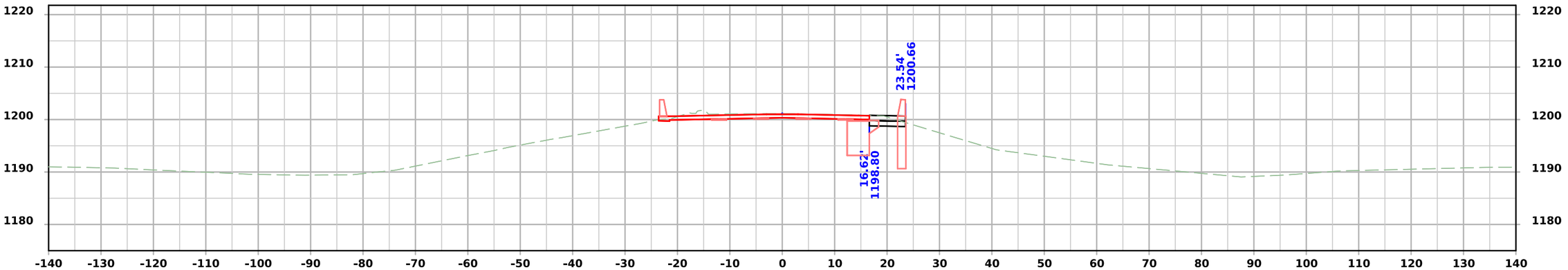

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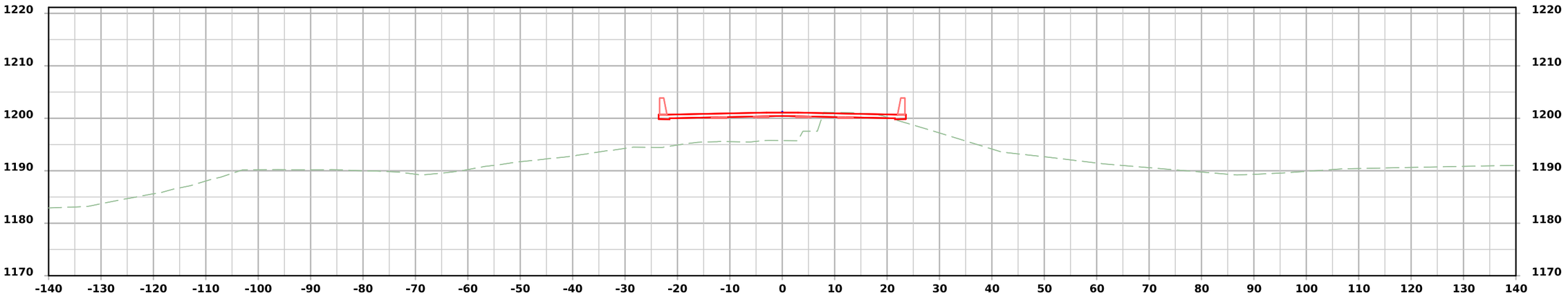

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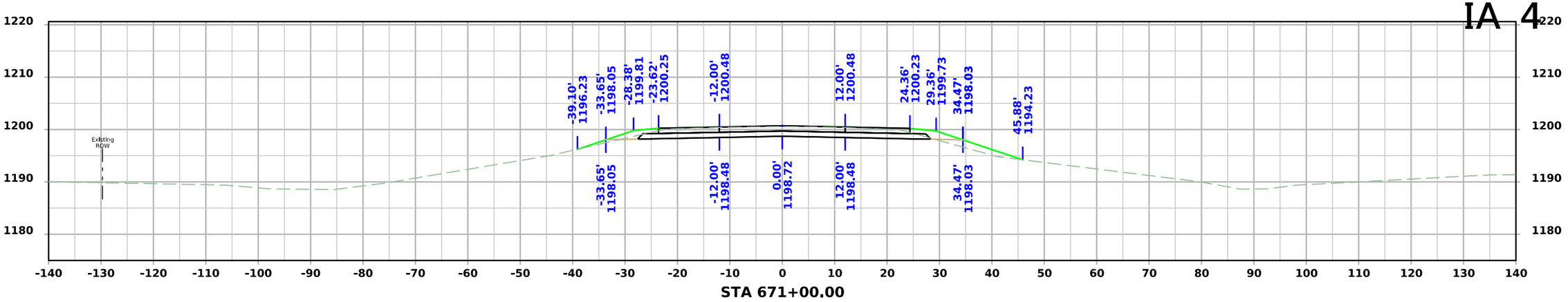

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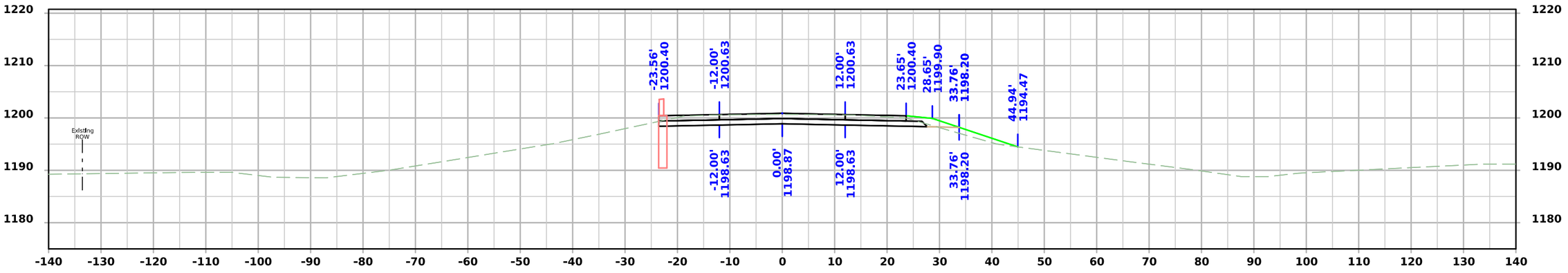

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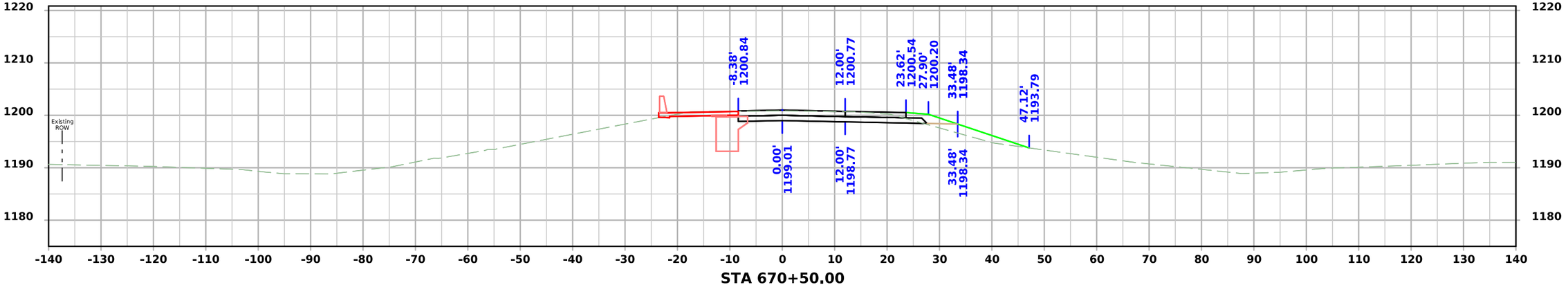

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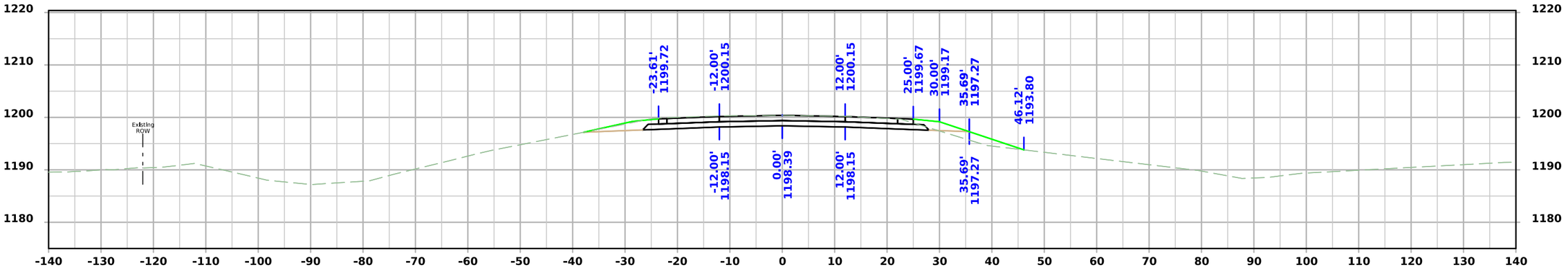
IA 4



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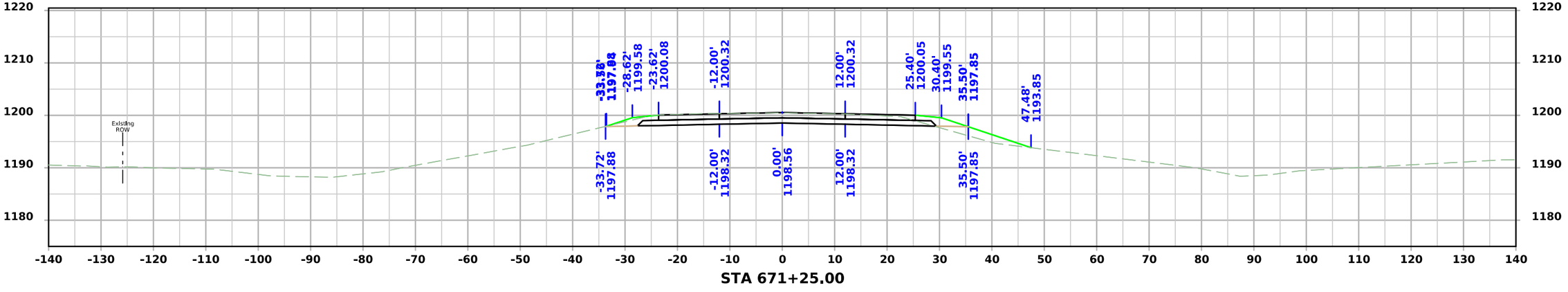

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FILE NO. 32299	ENGLISH	DESIGN TEAM JIA / SCHOENROCK / RYAN	PALO ALTO COUNTY	PROJECT NUMBER BRF-004-5(51)--38-74	SHEET NUMBER W.17

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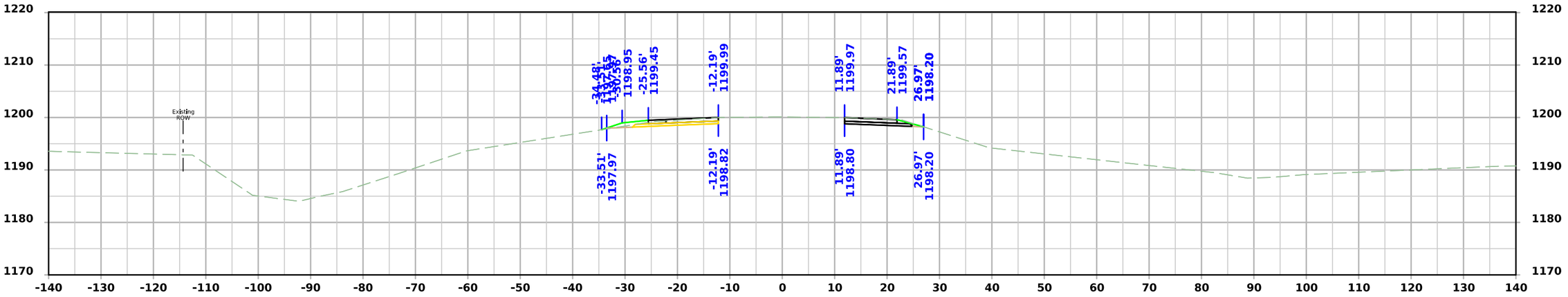
IA 4



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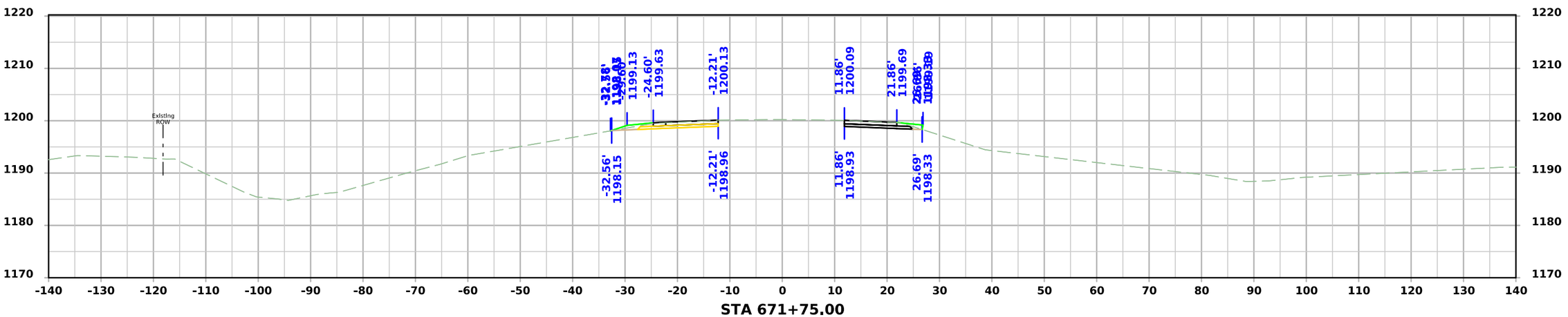

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FILE NO. 32299	ENGLISH	DESIGN TEAM JIA / SCHOENROCK / RYAN	PALO ALTO COUNTY	PROJECT NUMBER BRF-004-5(51)--38-74	SHEET NUMBER W.18

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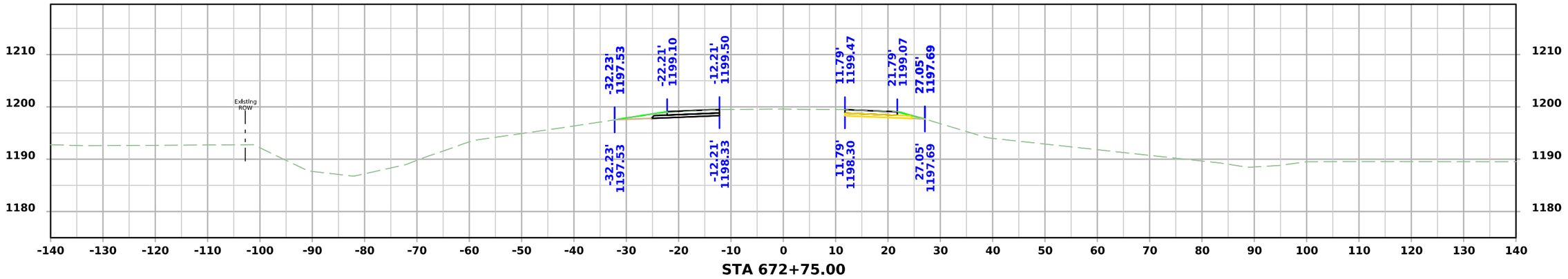
IA 4



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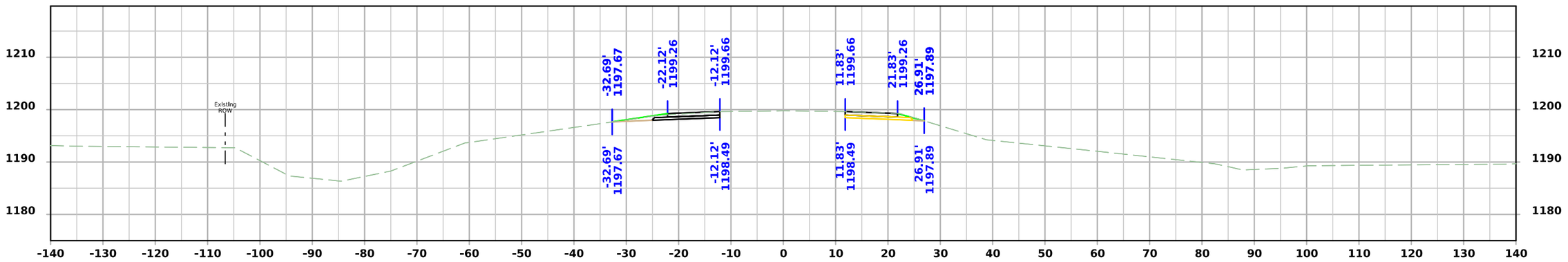

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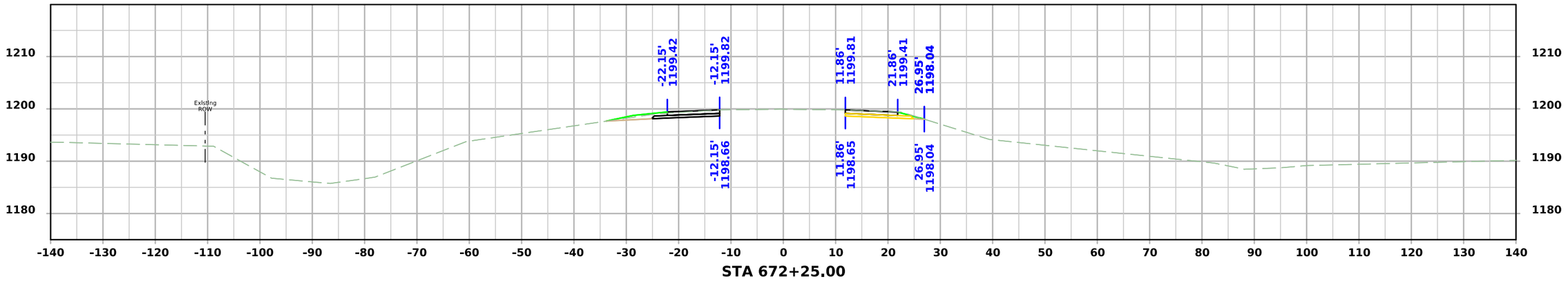

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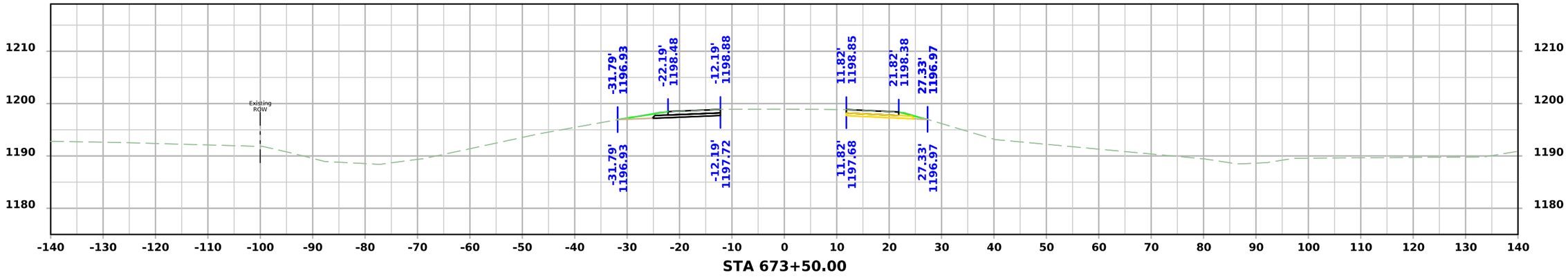

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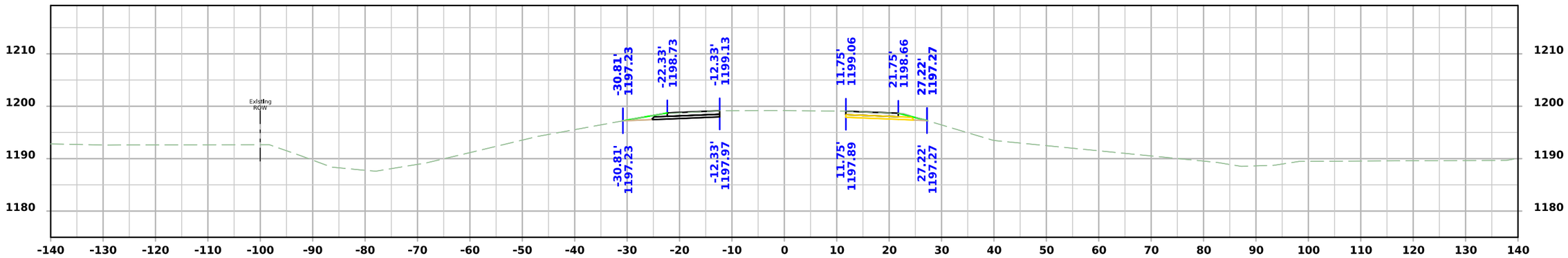

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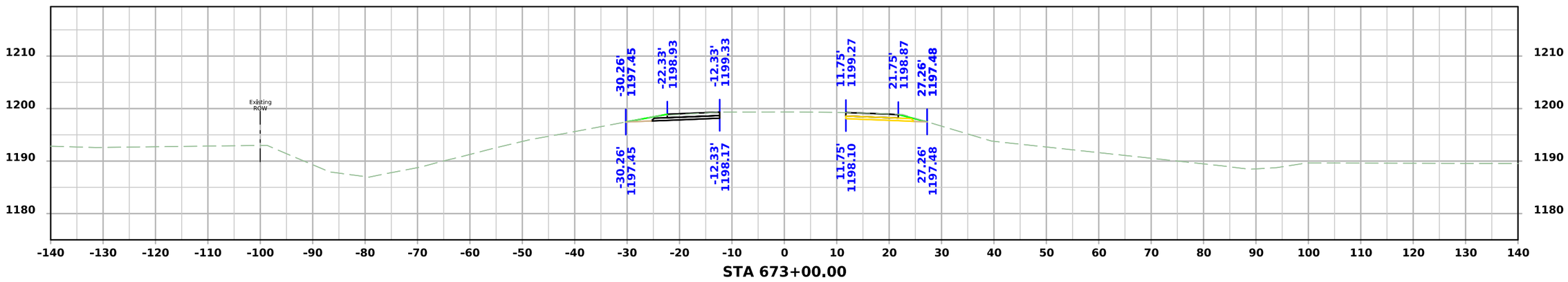

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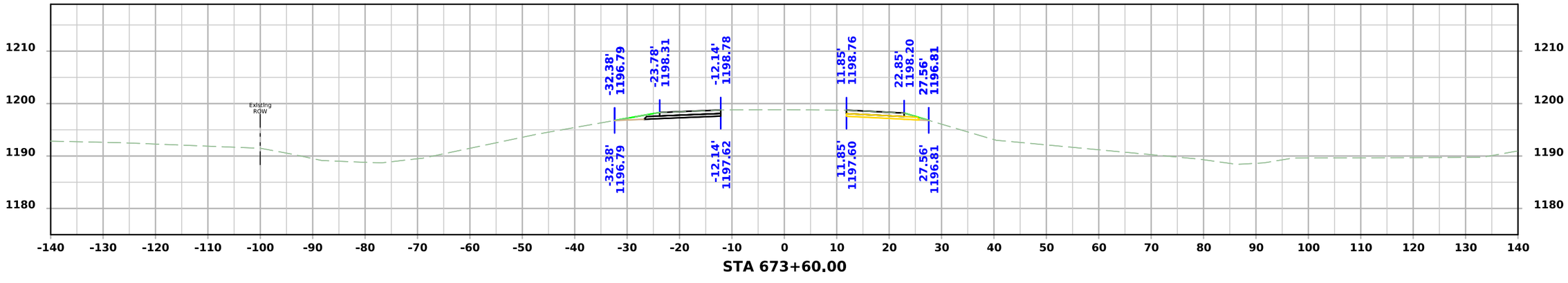
IA 4



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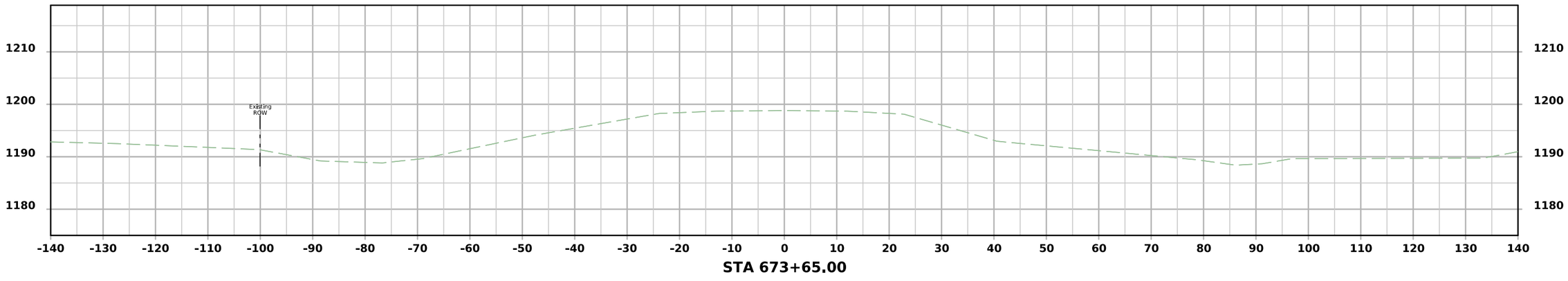

FILE NO. 32299	ENGLISH	DESIGN TEAM JIA / SCHOENROCK / RYAN	PALO ALTO COUNTY	PROJECT NUMBER BRF-004-5(51)--38-74	SHEET NUMBER W.22

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